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GigaMem

Commodore
AMIGA
A   1200

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WHEN COMMODORE LAUNCHED the Amiga 1200 with its massive 2 Mb of RAM and fast 68EC020 CPU, Amiga users world-wide were relieved to see an entry-level machine with a respectable processor and a reasonable amount of memory. Those who upgraded 1 Mb or 512 Kb 68000 Amigas were treated to what seemed an impressive memory capacity, with speed increase to match.

They quickly came to realise, however, that 2 Mb was not enough after all. Whereas previous machines would have managed quite well with a mere 2 Mb, the A1200, with its AGA chipset and Kickstart 3.0, proved much more memory-hungry than its predecessors.

Many upgrade options have since become available to A1200 owners. All expansion products plug into the trap door of the A1200, excluding PCMCIA memory expansion cards (more on these later). It is now possible for the user to upgrade in such a manner that the A1200 will outperform an A4000 in some

MORE POWER!
A1200 Upgrades

by Rowan Smith

operations. This article, however, will focus solely on upgrading an A1200, rather than compare performance indexes with the A4000. Maybe in a later issue...

The following analysis will enable you to decide which option best suits your needs. ■

CPU

THE CENTRAL Processor Unit is the nerve centre of a computer, where all the work is done. The MIPS (millions of instructions per second) capability of your CPU normally determines the speed of your computer. Unlike other mainstream home and business computers, the Amiga possesses a set of custom chips which do much of the donkey work for the CPU. Many other CPUs (including those in PCs and Macs) carry out the entire workload. Remember, therefore, that although the CPU may sound slow, the Amiga is a very capable machine.

The processor shipped with the Amiga 1200 is the Motorola 68EC020, clocked at 14.3MHz. Although some A1200 users find this adequate, more and more are investigating expansion options to enhance productivity.

It is possible to expand the A1200 to make it faster than some A4000s.

CPU OPTIONS

THE CPU COMMAND, provided in the C directory of Workbench 3.0, allows the user to control various features of the 68030. The 68030 has two different memory caches - the Data Cache and the Instruction Cache, each 256 bytes in size. Each instruction executed and byte of memory processed is stored in its respective cache. Every time the processor needs to execute an instruction, it first checks the Instruction Cache. If the instruction is in the cache, it processes that instruction and moves to the next (a very fast process). If the instruction is not in the cache, it is necessary for the CPU to fetch the instruction from memory (a slow process in comparison). Four instructions which need to be executed 100 times, will be much more quickly read from the cache, than from memory! Burst mode is a method by which the CPU is able to quickly fetch many instructions. Very few cards, however, feature Burst mode capabilities, and the only one reviewed here is the CSA Twelve Gauge (see comparison graph).

The Amiga 3000 has no Burst mode capability, and turning it on or off makes no difference to its performance. The 68030's 256 byte cache is many times faster than memory, which greatly enhances system performance. Data caches behave in much the same manner.

The Kickstart ROM is slightly slower than the RAM found on most expansion boards. By placing your ROM into RAM, a significant speed increase is achieved. Whenever a program calls a particular routine found in a system library (not a library in libs:), such as WritePixel(), found in graphics.library, the call is made to ROM. If the ROM is in RAM, this process is speedier. Copying Kickstart into RAM has one drawback - you lose 512 Kb of memory which is not retrieved until you reboot (or run CPU NOFASTROM). The CPU command uses the MMU to move the ROM into RAM, so machines with EC CPUs are unable to remap Kickstart using this command. However, others may be provided.

68020 vs 68030

IN COMPUTER TERMS, there is no difference between these two CPUs - the instructions found on the 68030 are identical to those on the 68020. In human terms, however, the difference is significant. The 68030 is a smaller, neater and more compact chip, with improved microcode (the lowest level language executed by an instruction), allowing faster instruction execution and electron transfer between circuits. For this reason, the 68030 can also be clocked at higher frequencies. A 25MHz 68030 will perform at twice the speed of a 25MHz 68020, with a 50MHz 68030 outperforming a 14.3MHz 68EC020 by 650%. Only 68030 or 68EC030 CPU accelerators are available for the A1200.

68EC0x0

The EC version of the Motorola 680x0 series is an EConomy version - in effect, the chip does not have an MMU. Specific programs - usually those which implement virtual memory, or remap areas of memory - require MMUs, e.g., certain Kickstart remapping software, (such as CPU, which is shipped with Workbench 3.0). The average user, however, will have no use for an MMU.

Maths Coprocessors

FPUs (Floating Point Units) greatly enhance the Amiga's mathematical ability. By simply adding a 14.3MHz 68881, the A1200 will perform floating point operations at up to fourteen times its standard speed.

68881 vs 68882

In computer terms, there is no difference between these two maths coprocessors. If your software has been specifically written to utilise an FPU, that software will utilise either a 68881 or a 68882. In human terms, differences are identical to those discussed in 68020 vs 68030. A 25MHz 68882 will outperform a 25MHz 68881 by 135%. At present, the fastest 68881 available for the A1200 is 20MHz, compared with 50MHz 68882s. A 50MHz 68882 will perform floating point operations at 475% the speed of a 14.3MHz 68881.

Twelve Gauge

CSA ■ NZ$1495 ■ AS99'

ADU APPROVED

COMPUTER SYSTEMS ASSOCIATES really outdid themselves when they released this wonderful card - all you need for your Amiga on a single board. The test module was a 50MHz 68030, 50MHz 68882 and SCSI interface. Fitting the card was slightly more involved than the other reviewed cards, as it is necessary to slide a connecting cable from the rear expansion port on the A1200, into the trap door compartment. This then snugly plugs into the end of the Twelve Gauge, and a single mounting screw, inserted through the base of the A1200, secures the 25-pin Amiga standard SCSI connector.

With no user-configurable jumpers on the board - only those for diagnostic purposes - configuration was a breeze.

When you power up your Amiga, the CPU's data and instruction caches are enabled, along with data and instruction Burst mode for maximum speed. This is the only expansion card I have found for the Amiga 1200 with full Burst mode support, which, as illustrated in the accompanying graph, makes a significant difference. Because of the increase in speed, this card became exceptionally hot! CSA advised that no damage could be caused from this heat. However, you wouldn't want to put it on your best varnished table, in case it stripped the finish! As this was the fastest card, I used it most of the time: the house didn't burn down when I left my computer running overnight, so it can't have been too hot!

A SCSI device is provided, named csascsi.device. The software (SCSItools) allows the user to easily format and partition any hard drives attached to the system. The csascsi.device supports the Amiga standard RDB (Rigid Disk Block) format, making SCSI drives portable between any Amigas fitted with an Amiga standard SCSI interface.

Unfortunately the CSA Twelve Gauge lacks a clock (possibly the only reason it didn't get 100%!), but when coupled with a 12A'Clock, this combination is unbeatable.

The manual takes the user step by step through the installation procedure. Nothing is left to chance, i.e., the user is told to unplug all cables, PCMCIA devices and remove any floppies, as this may cause difficulty when opening the trap door - I don't think so, Tim! Seriously, though, it is written for the complete "computer-illiterate" - even Al could understand it! More power... ■

Supplied for review by The Parts Warehouse

TWELVE GAUGE

SPEED	★★★★★
FEATURES	★★★★★
EASE OF USE	★★★★★
MANUAL	★★★★★
VALUE	★★★★★

94%

PCMCIA COMPATIBILITY

2 Mb and 4 Mb memory cards can be purchased, which plug into the 16-bit PCM-CIA socket on the left side of the A1200.

The A1200's designers originally stated that PCMCIA memory would be found at memory location $0600000. This meant that any other memory added to the system, would need to be located in the 5.5 Mb between Chip memory and the start of this address space, or after it in the upper ranges. Unfortunately, some memory expansion cards do not have the ability to remap their memory, where others have no problem, and some are provided with programs to assist. The simplest solution is not to buy PCMCIA memory.

If you already have, ensure that your expansion card is capable of operating with it, unless you intend to sell it to an A600 owner. (If you own an A600, PCMCIA is a great way to upgrade your Amiga's memory capacity, as the A600 is a 16-bit machine!)

Okay, Okay, So It's A Digital Time Base Corrector, But can it...?

THE PLUS MEANS YES!

Without TBCPlus

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TBC
A2000
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Following **GVP**'s philosophy of complete feature integration pioneered by our **G-Force Combo**™ accelerators (used in a majority of Amiga® Video Toaster™ Workstations), we are proud to present a professional TBC with time and money saving features.

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Plus – Full SMPTE/EBU encoding/decoding/striping available as an option.

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"This is simply the most powerful and flexible video stabilization device for the Amiga computer. The TBCPlus makes an excellent complement to any GVP IV24™, NewTek Video Toaster™, or Centaur OpalVision™ Graphics System. The Plus means it also offers more!"

Gary Gehman, President Magic Bullet Communications, Inc.

BIG MOVES ARE afoot at ADU. We've moved into new offices, employed more staff, networked more Amigas - and gone MONTHLY! You've all been asking for it, and here it is. The best Amiga magazine in Australasia is now a regular monthly publication. So don't forget to look for a new issue in April!

Some readers are disappointed that favourite tutorials are missed from some issues. We cannot publish tutorials on every subject in every magazine. We simply do not have enough space (and do not plan to increase the size of ADU - yet). We are also somewhat at the mercy of writers, who all have other commitments and are not able to write every month. Be assured, though, that we are expanding our writer base to include more than one on each subject. Tutorials will probably appear every second or third month.

We have also changed our subscriber disk system, to feature one disk per month. Games demo disks will continue and we will let you know when these are available. A separate subscription for games disks is also in the pipeline.

ADU PD Disks are now available to all readers as back orders (see page 50). All Amiga users are invited to submit intros for this disk, for which we need animation and sound between 200 and 300 Kb, unarchived.

The new MPEG module for the CD[32] has been released. The astounding results have given CBM another jump on the competition, but since movie CDs are not being distributed yet, it hasn't made much of an impact. This is about to change, I hear, so keep your eyes open for CD movie titles. It's a great piece of hardware, which definitely puts Commodore technologically ahead of other computers, but is it really benefiting all the diehard Amiga users? Hopefully, it will when Commodore release the CD[32]-ROMs for the A1200 and A4000, and we start to see software taking advantage of the technology.

Some hot new products for the Amiga are due out this year. We are seeing another range of accelerators released for the A4000 and A3000 (at last - just when we thought our A3000 had been forgotten!); exciting new video products like JPEG and MPEG cards; hardware improving (and dropping in price); hardware and software competing with, and often surpassing, "real" industry-standard computers. Once Commodore release their promised CD[32]-ROMs, we'll start to see more than just AGA games on CD. And last, but by no means least, the emergence of the new Fargo Primera thermal wax printer, complete with Amiga drivers! Amazing! With superb print colour at such a low price, you can be sure that we'll have one in here as quick as you can say "dye sublimation".

In New Zealand, Commodore have introduced TV's One World of Sport to the Amiga, with games results overlays being used in both golf and athletics recently. In Australia, Colour Computer Systems are releasing their Media-Flex system which will knock the broadcasting industry on its ear.

All this from a "games" machine!

1994 looks like the year the Amiga comes of age. If it is to survive as a computer, it must take a solid market share. To do so, it must first address professional users, a move which will, in turn, have a positive spin-off for the home user. Despite the fact that Commodore are producing models that are flawed (A4000), and more suited to the home market (A1200), the recent flood of accelerators, SCSI cards and video boards are clear evidence that third-party manufacturers are taking the Amiga more seriously.

If Commodore continued the trend and marketed their assets equally seriously, maybe professionals like Paul Nicolai and Yvonne Westra (profile page 44) would not have to avoid mentioning the Amiga hardware/software which has revolutionised their business.

> **"The best Amiga magazine in Australasia is now a monthly publication."**

COVERSHOT

Auckland artist Paul Nicolai created this image with TV Paint 2 Pro (reviewed on page 20). His company, Aura Creative, is profiled on page 44.

Graeme **Editor**

Clipboard

Quarterback 6.0

Central Coast Software announced a major upgrade of their best-selling Amiga hard disk backup and archival utility. Quarterback adds support for the advanced features found in the latest high-capacity tape drives, as well as faster compression, and the ability to back up a large hard disk across multiple tapes. The biggest change is the introduction of the "Schedule Pro" program, which allows the user to schedule and automatically run not only Quarterback, but any Amiga program! Unattended backups competing for processor time with unattended Imagine renderings, unattended Lattice recompilations, and unattended ProPage crashes. The mind boggles...

Press release from Central Coast Software.

EGS Without A Graphics Card?

A demonstration version of the Enhanced Graphics System (EGS) from Viona Developments has been released in the Public Domain as a stand-alone set of libraries and drivers for ECS and AGA Amigas. This means that users with Amiga 500+, A1200, A3000, or A4000 models can now experience the "look and feel" of EGS without splashing out on an expensive graphics card. The default EGS screen will be, of course, limited to standard Amiga modes, but the 24-bit internal colour accuracy will be preserved.

Press Release from GVP.

VLab: VHS->IFF

For less than US$600, the VLab series offers Y/C compatibility, multiple inputs, and compatibility with all S-VHS and Hi-8 camcorders. VCRs and laser disc players. NTSC and PAL can be digitised in realtime without the need for an expensive, frame-accurate deck.

Using the new Interleaved Frame Recording, lengthy digital video segments can be digitised in multiple passes of the original material. VLab looks for a "Key Frame", and digitises as many frames as it can, until the end of the sequence. Then the user is prompted to rewind the tape, and VLab digitises the frames it missed in the previous pass. This process continues until all the frames are grabbed

By combining the IFR process with the AirLink infra-red controller from GeoDesign, the whole process can be automated.

VLab comes in three configurations. VLab standard (US$500) or VLab Y/C (US$600) for A2000, A3000, and A4000, and VLab Ext (US$550) for A500, A600, and A1200.

Press release from MacroSystemUS.

PageStream3 Queries

After extensive questioning, we finally found something that the makers of PageStream3, Soft-Logik, admitted it could not do. Hiding individual objects is "not implemented at this time, but it is on our to-do list".

The ability to hide the contents of a box makes screen updates of layouts (especially with detailed clips or gradient fills) much faster in ProPage, but "PageStream3 has lots of other time-saving features which ProPage lacks, so this is not a big deal."

In addition, PageStream3 can use ANY Amiga-displayable screenmode, and change screenmodes on the fly (even to a window on the Workbench) and comes with upgrades to BME, PageLiner, and HotLinks. Pages can now be "joined" vertically as well as horizontally, so that text or graphics can be spread across the page break without resorting to fancy tricks.

Press release from Soft-Logik.

PageStream
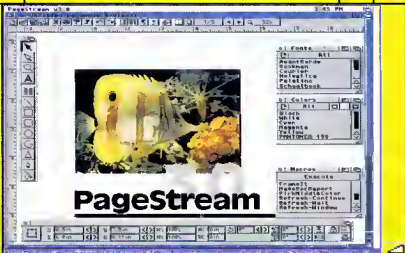
ADPro 2.5 released

ASDG Incorporated announce the release of ADPro 2.5, "the most significant upgrade in the product's history", according to the company. ADPro's GUI now runs on many third-party display boards, such as the Picasso, EGS, Retina, and Video Toaster using RTG technology ADPro can now render images in a window on the same screen as its user interface

ARexx support has been built in from the interface-level downwards, with over 100 pre-written ARexx programs ready to go, and the ability to have user-defined ARexx programs incorporated directly into the configurable user interface.

ADPro 2.5 will remain at US$295. Existing owners can upgrade for US$45, or by telephone with Visa, MasterCard, or American Express.

Press release from ASDG Incorporated.

MultiLayer, MultiFrame-ADPro

In the style of Morph, an interface that drives ADPro through ARexx scripts to produce animations of one image morphing into another, come these two new products from MacroSystemUS.

MultiLayer for ADPro is a compositing/layering tool for video professionals and artists, using ASDG's ADPro as a compositing engine. Several types of compositing/keying are supported: zero/black keys, luminance and chrominance keys, and alpha keys. All compositing is, of course, totally digital, so the layers are as clear as the original images. Layers can be faded in and out to variable transparencies at variable rates of speed, and movement of layers and images can be completely customised. The preview can be animated and modified with a VCR-style interface. MultiLayer requires no knowledge of ARexx. Suggested price: US$200.

MultiFrame-ADPro allows users to change the values of any ADPro or MorphPlus operator over time by using spline-based path control with adjustable knots, tension, continuity, and bias for non-linear motion control. Looping effects, or effects that accelerate or decelerate towards or away from values are easy to create.

All parameters entered can be saved separately from the images for re-use, and adjustment. All this with just a few clicks of the mouse, and absolutely no knowledge of ARexx or programming is necessary. Suggested price: US$130.

Press release from MacroSystemUS.

Music To The Masses

The Blue Ribbon SoundWorks Ltd have announced the release of several new hardware and software products to assist the creation of superb musical scores on the Amiga.

On the hardware side is the One-Stop Music Shop, a 16-bit sound card with 4 Mb of professionally recorded and mixed sound samples in ROM, an on-board MIDI interface, and more. Software featuring cross-fade, alternate source modulation, and complete instrument design makes the task of composing masterpieces just that bit easier! Price US$649.

MIDI compatibility scores highly, with the release of SyncPro, Triple Play Plus, and The PatchMeister. In order, these are:

- A universal MIDI/SMPTE synchronisation box, designed especially to work with any other Amiga program that makes use of MIDI time code. SyncPro can generate and read all SMPTE formats, convert SMPTE to MIDI time code, duplicate all SMPTE stripes, synchronise any software using either MIDI or SMPTE timing, and merge all MIDI time code information with other MIDI streams. US$199.

- A three-in-one MIDI interface, that blows away the MIDI limit of having 16 channels playing simultaneously, by providing three separately-addressable MIDI outs to give a total of 48 simultaneous channels. Also provided is one MIDI through, and MIDI in and out tools for Bars&Pipes Professional. US$179.

- The universal MIDI librarian for everyone, The PatchMeister can store an unlimited number of Banks and Libraries of patches and samples, and features a full array of "point and click" options for easy access to all your MIDI data. Comes standard with over 50 custom drivers (from Alesis to Yamaha), and 160 SysEx templates to assist in driver creation. US$99.

Coming Up

Also from The Blue Ribbon SoundWorks are two software releases, soon to be reviewed in ADU. Bars&Pipes Professional 2.0 ("encompasses the finest tools available to music and multimedia artists"), and SuperJAM!, the easiest way to compose an entire song without playing a musical instrument. Boasting "new TurboSound technology", where 16 different instruments can be played simultaneously on the Amiga (results will depend on memory and processor speed), SuperJAM! allows you to play your own drum tracks and accompaniments using only the mouse.

Press releases from The Blue Ribbon SoundWorks Ltd.

More Power!

GVP announced the release of the A4000 GForce040 - a 40 MHz 68040 accelerator for the A4000 AND A3000 series. The accelerator boasts a 40 MHz 68040, up to 128 Mb of 32-bit RAM, and a modular expansion socket for SCSI-II, EGS-110 cards, or whatever GVP come up with. All without taking up a single Zorro III slot!

Shipping is expected to begin this month. Saving up should have started, for many power-hungry users, a long time ago...

Press release from GVP.

More "More Power!" Power!

MacroSystemUS announce the release of the Warp Engine accelerators for the A3000 and A4000 series. The Warp Engine for the A4000 comes in three flavours: 28 MHz, 33 MHz, and a tasty 40 MHz. All accelerators feature 4 SIMM sockets, and the NCR SCSI-II controller chip.

The entry-level 28 MHz Warp Engine comes with no 68040, because the standard A4000/040 already has a 28 MHz 68040 chip. Simply remove this chip, insert it in the Warp Engine (with all the motherboard memory), and add a SCSI-II drive to enjoy the fastest SCSI-II controller available for the Amiga. And NO Zorro III DMA problems!

The A3000 series of Warp Engines is the same as the A4000 series of Warp Engines, except that the RAM expansion is limited to 64 Mb. Who needs a "Rocket" when there's the Warp Engine? From US$900.

Press release from MacroSystemUS.

TBC-Wars

New in the field of Time-Base Correctors, Electronic-Design's latest TBC features a "new designer case". As standard are the Y/C S-VHS input and Composite input, and output formats include Y/C, Composite, and RGB.

When used as an enhancer, the TBC splits and filters the video signal into its component parts, digitises in studio-quality 4:2:2-standard, and passes it back out with a new sync-signal (and any changes/corrections necessary).

Available mid-1994.

Press release from Electronic-Design.

Toccata

In conjunction with the VLab, MacroSystemUS have announced the release of the Toccata 16-bit audio board. Able to be used with the VLab IFR digitising process to record the soundtrack with the video data, the Toccata is a full 16-bit audio digitiser with three stereo inputs, one mic input, and one stereo output. The Toccata can digitise at up to 48 kHz (DAT rate) direct to hard disk. Playback can be up to 16 channels in 16-bit!

Toccata comes with a special version of SEKD's award-winning Samplitude package, named the best audio editing software in Germany.

Features include: 44.1 kHz rate for mastering CDs, 64-times oversampling, 90 dB signal-to-noise ratio, dual 16-bit D/A and A/D converters. All this on a Zorro II card, compatible with all A2000, A3000, and A4000 computers. Available soon, with a full one-year warranty, for US$600.

Press release from MacroSystemUS.

New Genlock

Electronic-Design, of Germany, announced the release of the Neptun-Genlock. Highlights of this genlock include the implementation of an Alpha channel, to transpose semi-transparent titles on to existing video, and for super-smooth antialiasing.

The Neptun-Genlock is the first Electronic-Design genlock that can be software controlled. It comes, of course, with its own driver software. Available early 1994.

Press release from Electronic-Design.

Monthly ADU

Monthly ADU

Monthly ADU

Messive Retina Update

MacroSystemUS destroys the previously unsurpassable 800x600x24-bit resolution limit that has handicapped many Amiga display cards to date, with the release of the new Retina display card.

24-bit display to 1152x862! 1280x1024 non-interlaced! A 24-bit Workbench! Gasp! All these wonders are promised with the new Retina, which displays at frequencies in the range 15-80 kHz (horizontal) and 50-110 Hz (vertical), with a 60 MHz, 100 Mb/s, 32-bit bus to the video memory.

Using custom RetinaEMU software (the writers claim to have tried an implementation of EGS, but went back to their own proprietary software because it was faster), system-compliant programs can run in resolutions of up to 2400x1200, or use Ham8 from a non-AGA Amiga. Look out for a review in a future issue - but if it's faster than the Spectrum (which it looks to be from the spec sheet), waste no time and buy one now.

Press release from MacroSystemUS.

MovieShop: Splicing Hollywood's Best

MacroSystemUS announce a high-end VLAB system for complete non-linear editing capability of all video formats from VHS to Betacam. VLab Motion records and plays back realtime video directly to/from hard drive, with accompanying titling and overlay capabilities. Captured digital video can be overlaid on video input to the VLab Motion , and the easy-to-learn drag and-drop editing makes splicing your favourite movie takes as simple as watching them!

VLab Motion is bundled with MovieShop Pro, digital editing software, with a huge list of modular effects (make your own, and add more at any time), and more to come. Audio support is provided by the MacroSystemUS Toccata card. (see elsewhere in Clipboard).

Press release from MacroSystemUS.

Messive ImageFX Update!

Well, only if you happen to own a Spectrum card from GVP...

GVP have announced a version of ImageFX V1.5 designed to run specifically on the EGS-28/24 Spectrum. Available to all registered Spectrum owners now, direct from GVP, for only US$19.95!

Press release from GVP.

1994 World Of Commodore

After the huge success of the initial Australian launch of ADU (issue 3) at the 1993 Sydney World Of Commodore show, we here at the office are looking forward to the next one.

The countdown to WOC '94 has started - the party commences on July 15, at Sydney's Darling Harbour, and continues until the 17th.

Press release from The Others.

Look Out

Keep an eye out for the Retina Z-III - the Zorro III version of the 24-bit Retina card. Sources say that the card will sport the latest NCR graphics chipset, making it 3-6 times faster than the current Retina, and well over 10 times faster than AGA (as if that's anything to go by!),

Correspondence with MacroSystemUS.

IV48?

GVP have released the IV24-A4000, designed especially to take advantage of the Amiga 4000's increased video bus speed. The new version will be twice as fast as previous versions when installed in an Amiga 4000, and will perform identically to the previous version when installed in an A3000 or A2000.

The IV24-A4000 software set has been rewritten, and the previous IV24 software has been replaced with a bundled version of ImageFX 1.5 that fully supports the IV24 for framegrabbing, video processing, painting, and rendering out to tape.

Press release from GVP.

Productivity

Brief reviews of some of the hottest new products for the Amiga.

JD and Virus Extensions

Have you ever gone to write something in Amos, only to find that Amos, in spite of its vast library, doesn't have quite the command you are looking for? Or have you wanted to write a virus-checking program in Amos, but never been able to figure out how?

Have I got some Amos extensions (extra commands) for you! They come in the form of the JD (named after programmer Joerg Dommermuth) and VIRUS extensions. All you need is Amos Professional v1.11 or greater.

The JD extension adds 103 extra commands to Amos Professional, many of which I have also written in Amos Procedures. But with the extension, you no longer need heaps of procedures at the start of your program to give the commands that Amos lacks. Extra commands include: system, time and date reading and setting (times and dates are returned in neat strings ready to use); input routines which are more like Intuition (as you can edit a default string, rather than typing in a complete string); key press commands (including one to wait for a mouse key press, which, sadly, is not found in Amos); many more string manipulation commands; common mathematical formulas (i.e., per cent); and various screen manipulation commands.

Two commands really took my attention.

The X$=JD Get String$("Default", MAX_LEN) command asks the user to enter a string of maximum length MAX_LEN. (The "Default" is the default string, which the user can add to and change with all the usual editing keys.) The MKEY=JD Mwait command waits for a mouse key to be pressed, and returns the mouse key in MKEY. This excellent command saves a wee bit of typing to get Amos to mimic, as there is nothing in Amos to do this. The code I use is:

```
While Mouse
Key=0 : Wend
```

The VIRUS extension allows access to some of the low-level vectors and system structures unavailable to Amos, to ascertain, for example, what MC680X0 is running inside your Amiga. As the name suggests, commands are also included to check your computer for the presence of viruses: Aek, Bitcrew, Byte Warrior, Disk Doctor, Disk Herpes, Gadaffi, Irq, Lsd, Microsystems, Revenge, Sca and Vkill. Any viruses found during checks are removed, and appropriate flags sent to inform the user.

If you have been writing procedures for commands missing in Amos, or if you are just looking for commands to make programming in Amos easier, these extensions are for you. **RA■**

Update from PD Plus

The already-popular twin extension set for AMOS Pro, containing the JD and VIRUS extensions, has become even better! The updated JD extension now contains 122 commands, including nineteen NEW commands, which perform functions like: flushing all unused libraries, drivers, fonts and devices from memory; turning multitasking on and off; RE-DIMensioning arrays; array swapping...even commands to turn the drive LED on and off.

A new JD PRINTER extension has also been added, containing some 54 new commands to work with your printer. Basically all those control codes you previously had to send to the printer, for features like bold and underline, have been put into commands! A single command will turn all those functions on or off?

The manual has been updated and the pack is still only A$14.95. If you already have the older version, return your original disk with A$3.00, and we will update it for you. ■

Moving Pictures

A quick look at the new CD32 MPEG card (still in development) immediately after the 1993 World of Commodore show revealed just a hint of the great things to come. There was only one MPEG CD available, containing three music video clips, and, as we watched the large-screen TV, open-mouthed, it was hard to believe that all this sound and motion was coming out of a half-constructed circuit board, with pride of place going to the C-Cube MPEG chip.

A few months later, the production version is available, and a host of video CDs are now ready for purchasing. Video CD is not restricted to the Amiga CD32 platform - the MPEG format is an agreed standard, and there is a Full-Motion-Video add-on to the Philips range of CD-I players which, for a much higher price, provides all the same features that the MPEG cartridge gives the CD32.

Although deadline was approaching fast, I was able to take time out to watch Top Gun, Patriot Games, Star Trek VI, and a Bryan Adams video disc (containing 74 minutes of hard rockin' sound, and full-motion video). The sound was definitely CD-quality, and the picture was leagues ahead of Super-VHS.

Magic Lantern

Magic Lantern is a program designed to create, edit and display delta-compressed animations. It takes as input IFF files created from other sources (such as DPaint, Imagine, Real 3D, VistaPro etc.), from which it creates animations run on various frame buffers (like the

Retina, GDA and Amiga custom chips), in various display modes. Once an animation is

created, it can be edited: such editing might include adding or removing sound effects and frames, or moving frames around. All functions are accessible through a very friendly, Workbench 2.0-compliant, graphical, user interface (GUI), and/or an ARexx port. Magic Lantern allows creation of animations which are larger than memory-available memory, and provides a separate utility to play them back from disk. It cannot, however, edit or break up animations which are longer than available memory.

Each display device supported by Magic Lantern has optimised assembly language routines to play back animations as smoothly as possible, as well as an efficient means of storing animation data. Due to the way that the program stores data, Lantern can calculate on a frame-by-frame basis - sometimes a bit-plane-by-bitplane basis - which of the numerous bitplane compression options is optimum.

As a result, Magic Lantern can create animations optimised for size, speed, or both, for the target display device. This new file format - DIFF - is incompatible with the ANIM file format. Display devices currently supported are: Amiga custom chipset (original, ECS and AGA), in all resolutions; the GDA card from GFX Base in 8-bit mode in all resolutions; the Retina card from MacroSystemUS in 8, 16 and 24-bit modes in all resolutions; and the OpalVision card in 8, 16, and 24-bit modes in all resolutions.

Creating the DIFF is just a matter of listing all animation files and making them into a DIFF, which can then be edited to the user's own specifications e.g., moving frames within the DIFF; adding/deleting sound; changing the palette etc.. I was only able to use Magic Lantern on the OpalVision card, but results were impressive, to say the least. Realtime playback is very smooth and I was unable to flaw it on my 040. However, slower machines, such as 020s, may have different results.   **RS**

Supplied by The Parts Warehouse

Primera Colour!

Have a look at the output from the new Primera colour printer, seen briefly gracing the offices of ADU, while we gave the dye-sublimation and wax-transfer ribbons a good workout.

In the league of $20,000 Canon colour printers (one of which is locked securely away in the graduate laboratory at Auckland University's Computer Science department), this $2500 printer from Fargo Electronics Inc. is surprisingly small - almost a tenth of the size, as well as a tenth of the price!

Requiring special paper for both types of print (thermal wax transfer comes standard, dye-sublimation is an optional extra), the output from the Primera takes up to 15 minutes to produce. The printer makes three or four passes over the paper, and lays down a different primary colour at 200 dpi with each pass: Yellow, Magenta, Cyan, and Black.

This is a world away from dot-matrix printers, and though the output is somewhat ragged at 200 dpi, a 300 dpi laser printer does not have the advantage of colour. The colour accuracy of the Primera is unparalleled by anything in its price range. At $8.00 per sheet of dye-sub paper, the cost is more than justified when the colour is as accurate as you would find in an offset-printed Chromalin print.

When these expensive Chromalin colour proofs are necessary on a regular basis to check the accuracy and adequacy of colour in professional work, the costs can really start to add up. The Primera printer is, then, a far cheaper alternative.

Our printer reviewer, Grant Berridge, is already champing at the bit to try out the Primera himself, and a glowing review will no doubt be forthcoming in a future issue.   **PM**

Supplied by Camworth Systems Limited

A number of companies have started to produce digital video CDs, distinguishable by the Digital Video label. Look for these in your local video store, as they will be coming thick and fast once the players become established.   **PM**

Supplied by Commodore (NZ)

Example 6

light_source
  <0, 10, 0>
  colour White
  area_light <2, 0, 0>, <0, 0, 2>, 5, 5

ps. Pages Made to Measure

*In this look at the PostScript language, **Norbert Haley** dives in at the deep end...*

WELCOME BACK TO the wonderful world of PostScript. In this issue, we will attempt to delve into some of the many practical uses of the PostScript programming language.

Generics

In order to be really practical, we'll cover some of the PostScript generics first. For example, you might want to try to print something on another person's PostScript printer. This might even be an Apple Laser (cough cough), so wouldn't it be nice if, after transferring your PostScript file to a Macintosh disk, you could just send your file to the printer. Well, you can! The PostScript language is portable among all PostScript printers.

There is a small convention which it is sensible to stick to, which allows printers or print spoolers to recognise the incoming file as a PostScript file and switch emulation accordingly. Use "%!" as the first two characters, and end the file with character 4 (Control-D) to indicate end of transmission (EOT).

As we learned in ADU 3, the percent sign and what follows, up to and including the next carriage return, is ignored by the interpreter. Therefore, the "%!" combination is used to identify the incoming data as a PostScript file. This can have advantages, in that the printer's controlling software can automatically switch between emulations. The EOT character is self-explanatory: if it is not there, the PostScript interpreter might wait for more data, and, when not receiving it, issue a timeout error. Although most PostScript interpreters (such as POST) do not require these characters, it is wise to have them, for universal portability of your PostScript files.

Now that we have covered some practical aspects, let's get into the exciting stuff. We will generate a logo for the ANTI BLUES COMPANY.

(See Listing 1.)

Program Post Mortem

What a mouthful! There is nothing like jumping in at the deep end! Quite a program really. What it does is paint. It creates a thick grey circle and fills it with repetitions of the phrase "Anti Blues Company", using a procedure ("fillWithDaWerdz").

Clipping

The word clip sets the outer limits of a new page: here, it was the circle. If you comment out "clip", you can see the page fill with the words as they are generated (try it!). You'll find the clip command very powerful. It is quite difficult to emulate in desktop publishing programs, particularly when incorporated with something other than a circle. While writing your own PostScript code, you may easily impress some desktop publishing professionals. It may be possible to coerce a job out of a typesetting bureau by impressing the manager with a few clever lines of PostScript code. After all, the people who made the logos for those well-known companies were probably well paid. Besides which, we have more than enough uninspiring logos.

Last lesson's homework was also about "clip". The "default clippath" was stroked." The default clippath is the largest image size, or how close to the edges of the paper the printer can print. You can therefore use "clippath" to read out the current clipping path, or in last lesson's example, print a sample of the largest image the printer can handle. In the case of POST, it might be extremely useful to align the page on-screen with the one on your printer.

In our Anti Blues program, the new "largest imageable page" is artificially reduced to a circle. Any pixels which land outside that area are not set.

Listing 1

```
%! Postscript follows ....
% Logo for the ANTI BLUES COMPANY,
% public domain by N.Haley 1993
%
/Times-Italic findfont 22 scalefont setfont  % font voodoo
gsave                                         % store the graphics state
300 400 200 0 360 arc                         % a circle
gsave                                         % store the graphic state and
                                              % thereby the (circle-) path
8 setlinewidth                                % make all drawn lines 8 pts wide
.5 setgray                                    % make everything 50 % grey
stroke                                        % makes gray circle, deletes path
grestore                                      % get the old graphics state again
clip                                          % the magic word
/fillWithDaWerdz                              % name of procedure to be defined
{                                             % begin proc
  20 {                                        % times repeated
    6 {                                       % times repeated
      {Anti Blues Company } show
    }                                         % this mini proc
    repeat                                    % inner repeat loop
    -1120 -22 rmoveto                         % move to new position - relative
                                              % to old one
    % You can add a line here. Read on!
  } repeat                                    % outer repeat loop
} def                                         % define fillWithDaWerdz
-80 620  moveto                               % startpoint
fillWithDaWerdz                               % do it :
grestore                                      % back to before the clip

100 100 moveto
(We all have it ...) show                     % The Blues message ...
showpage                                      % spit out page
```

blues Compa
Blues Company .
Blues Company Ant
ues Company Anti B
's Company Anti Blue.
Company Anti Blues (
'mpany Anti Blues Co
'ny Anti Blues Cor
Anti Blues Cor
Blues Co

We all have it...

Procedures

For educational reasons, the actual "process of printing the words" was placed into a "procedure". A procedure can be executed at a later time, and it can be executed any number of times. This allows for repetitive tasks to be

entered only once. In the example, it didn't have any advantages, as we only called it once anyway.

Defining procedures is easy. Invent a name for the procedure (usually one which sums up what the procedure does), put a slash in front of the name, telling the interpreter that a new name is coming, and then a {, marking the start of the procedure and a } marking the end of the procedure, followed by a def.

There is also a different "def", called "bind def". This is used often, because it is preprocessed (compiled), thus meaning that the interpreter already knows what to do and has converted it into its own language. It therefore executes faster, when called, but it is slightly slower to define.

```
Listing 2
%! "curveto", "closepath" and "fill" demo
10 setlinewidth
50 50 moveto
0 500 400 400 500 20 curveto stroke
2 setlinewidth
30 800 moveto
500 500 100 500 560 800 curveto stroke
100 100 moveto
300 700 lineto
550 100 lineto
5 setlinewidth
closepath stroke
150 150 moveto
350 150 lineto
300 300 lineto
fill % closes path automatically
```

A Crazy Idea

If you choose a name for your procedure, which is already used as a PostScript command, your command overwrites the PostScript equivalent and it will no longer work as it should. Anyone can redefine PostScript commands, but you're not that crazy, right? In many cases, you will do it and despair. Sometimes though, it can make sense. Enabling and disabling the showpage command allows you to electronically paste elements of a page together. One can import other programs' PostScript output and "glue" the separate pieces into one's own page description. That is exactly the principle of the so called Encapsulated PostScript files. There are easier ways, though. For fun, try "/show {print} def".

Repetition

The "repeat" loop is an easy concept to grasp. It, too, uses curly brackets. You give a number, a curly bracket ({), a list of commands, a closing curly bracket (}), and the word "repeat". The enclosed commands will be repeated that "number" of times.

"gsave" is used to store the current graphics state. Things such as colour, linewidth setting, scale setting (just say 2 2 scale, and everything is twice as big), clip path, current point, and current path are saved using "gsave". "grestore" recalls the last "gsave" state. The gsave-grestore combination can be nested - available memory is the factor here.

Here are a few more useful drawing operators, demonstrating the command "curveto" to define a curved path (see Listing 2).

The curves here are Bezier curves. They have a start and an end point, but also two others, which "pull" the straight line into a curve. The syntax is X1 Y1 X2 Y2 Xend Yend "curveto". X1/Y1 and X2/Y2 are these "magnet points". A starting point must have existed: either you define one, or if there is already a path, the curve will be appended to that path.

Extras

A nice little addition to the Anti Blues Company file:

currentgrey .05 add setgray

This line can be inserted into the ABC-logo file where indicated to make a greyscale happen. Here the current status of the setgray operator is read out. The result is put on the "stack", 0.05 is added to it and the new graytone is set from that.

"Stack"? "Add"? Are those terms important? The answer is yes. We have to dive into that next lesson, when we will examine mathematics with the PostScript interpreter.

Homework is to use the "scale" command, and try "100 100 translate". Try to use both in front of the ABC-logo file, and print the largest possible logo on the page.   ∎

*Long lauded as the best in high-end, 24-bit painting, TV Paint's multi-platform approach gives it the edge over other dedicated packages. **Paul Nicolai** looks at the Retina version of...*

TV Paint 2 Pro

TecSoft Images ■ NZ$695 ■ A$599

TV Paint 2 Pro is capable of bringing the artist's dreams to life...

FINALLY, AFTER YEARS of buying the latest paint programs and continually upgrading my hardware, I have reached a stage where I can achieve my artistic goals on my current computer set-up. Back in the early days of 1986, I was working on an Amiga 1000, with the first version of DPaint in 32 colours on a lo-res screen, and printing the result on an Okimate colour printer. I used to convince myself and others that one day, I would design and paint on a computer and achieve an output of a quality that was professionally acceptable. Programs like ImageFX, Brilliance, and ImageMaster are some of the more recent packages that gave me high hopes, but didn't quite make the grade.

Now, I feel that, as far as software is concerned, I've found what I've been looking for. It came unexpectedly. My purchase of the Retina card was the breakthrough, as it included TV Paint 2.0 Professional, a 24-bit paint program. The criteria by which I judge a paint program to be a success, lies in its ability to almost seamlessly fit in with the fluent way an artist uses paint, pencil, crayon, airbrush, etc. The time-consuming setting of gadgets with number values that need to be typed in, or the constant removal of requesters necessary to manipulate painting tools, have always irritated me no end, as they interrupt the creative flow. TV Paint 2 has no such problems. Almost all requesters can stay on the screen while you draw, and the program includes Undo and Redo buttons, automatic antialiasing, masks, and easy density control.

TV Paint has a set of almost every available tool, but it is the way in which they work that counts.

I had seen the program demonstrated by Commodore on a Rambrandt card, and originally believed it to be a video tool. However, after installing the program - unfortunately, it suffers from that most cruel of afflictions, the dreaded dongle - and reading the manual, I have discovered that it is an exceptional paint program for illustrative work. As I am using the Retina version of TV Paint, I am presented (on startup) with a screenmode requester listing all available Retina screenmodes.

Paint Away...

Dotted Line, Line, Curve, filled or unfilled Rectangle, Polygon, Circle, Oval, and Freehand are all the expected tools available. Additional functions are revealed by a second

Open any of TV Paint 2's multitasking preference windows from the main toolbox, then reposition them where you like...

left or right mouse click on some of the tool buttons in the main panel. For instance, the Curve tool reveals, after a left mouse click, the Bezier Curve tool. After drawing continuous lines in a zig-zag shape, click the right mouse button or press enter, and a Bezier curve draws itself through your control points. The curve tension can be set with a + or - button, or the value selected directly typed into a requester.

While TV Paint's list of draw modes is impressive - Colour, Stamp, Smooth, Blur, Smear, Shift, Impress, Trans, Shade, Light, Colourise, Dithering, Grain - it cannot match those supplied in Opal Technology's Opal-Paint, its closest rival. Of the modes listed, the only one you may not be familiar with is Impress, a mode which sources colours from the swap screen to create an impressionistic effect.

Brush controls have all the usual reduction and enlargement settings, as well as perspective controls and warping. The W hotkey forces the brush to be displayed at all times, rather than just a border representation (as many other programs use). You can even set the maximum brush size display in bytes! TV Paint supports only one brush buffer.

Airbrush control is excellent, with size and power gadgets, a range of brush shapes, and a graphical brush shape curve, which is totally adjustable by the user. From the same menu, you can set chalk or pencil controls, also capable of extremely realistic effects. The airbrush control panel has an area at its base for testing current settings before use.

When you fill with the flood fill function, you have control over a colour tolerance level from 1 to 255, but no separate selection for HSV or RGB colour modes (as in OpalPaint). Filling colours this way, means you can fill areas on your main screen with effects or pat-

terns you have created on your swap screen, or in your alpha channel.

For global control of your colour picture, simply manipulate (in realtime) the Colour Lookup requester's graphic curve. This allows the instantaneous creation of negative, false colour, solarisation, posterisation, and lighten/darken effects, in any of the following colours or colour modes: red, green, blue, and luma. This requester is very similar to OpalPaint's ChromaCTRL draw mode.

Unique control of the transparency setting enables you to paint or press through from the swap page, or an alpha channel. With the ten presets supplied, you can create a range of multiple star effects and gradations; a set of buttons reverses or mirrors any of these effects, and instant manipulation of a graphic curve is available for any of the selected effects.

Image Processing

A number of image processing functions are available in TV Paint 2, although it can't truly be called an image processor - programs like ImageFX, ADPro, and ImageMaster are definitely superior in this respect.

The convolution menu is accessible on the base of the Colour Lookup requester, with all the familiar routines listed: sharpening, laplace, blur, relief, etc. You can also create your own settings and save them. ADPro convolution files are actually stored identically and can be used with TV Paint - just place them in the TV Paint convolution drawer. The magnify window is scalable, with a little hand as a placing icon, a reducing and enlarging icon, and scrolling arrow icons on its edge. When dealing with page sizes bigger than the screen, you can work on the whole page, by simply zooming the magnification window out with the minus key - an excellent feature.

Hotkey support is virtually identical to DPaint, making TV Paint seem familiar right from the start. Masks are similar to the stencil functions available in OpalPaint, DeluxePaint, etc. Just select the chosen colour, or, by means of a tolerance setting, add or subtract colours or colour ranges to or from the mask. You can view the mask you have created, as well as add your mask to an alpha channel.

Big Pictures

Like ImageFX, TV Paint internally supports a virtual memory system, known as Big Edit, which allows the user to set up a drawer or a hard drive partition for working on large images, a 5000x1025 pixel picture for example. You can view this file reduced to screen size, or swap full-screen portions of the image into memory, to work on. Convolutions can

also be applied to the Big Edit file. With a Retina Card (4 Mb version), you can have a page size that is bigger than the screen. I can hold an 830x900 pixel page size in memory, complete with a swap page and an alpha channel, in my 16 Mb A4000. This represents the area in which you can work and scroll, while your screen size is, for instance, 800x600, depending on your monitor configuration.

The alpha channel function is, for me, the most interesting and complex feature of TV Paint. Like OpalPaint and ImageFX, TV Paint can add an 8-bit greyscale channel to any 24-bit colour picture, making the program truly 32-bit. This channel can be a paper texture, a pattern, or any other picture you create. With TV Paint, you can edit, reverse, or smooth this channel. When you have control over the combined contents of front screen, alpha channel, mask, and swap picture, through the range of tools which TV Paint sports, the combination of creative possibilities is endless. Time and effort are required for full understanding of the results that can be achieved, but once comprehended, this is a powerful tool. *(For an Alpha Channel definition, refer to The Video Arcade on page 32.)*
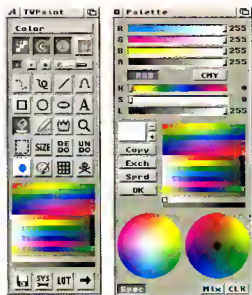
Automagic

A full implementation of ARexx is part of TV Paint, with ten ARexx programs at hand on the main panel. Effects like glass balls and dotted lines are executed as you watch. While an Arexx program is performing a group of drawing routines, you can change drawing modes and colours, and when finished, the undo function works on all the last ARexx actions performed. One of the supplied scripts produces an additional series of convolution options, ranging from emboss effects to impressionistic painting modes, which can be applied to your main picture.

TV Paint supports Wacom, Summa, and Kura standards for drawing tablets. A submenu on the main panel duplicates all double-clicked icons for graphic tablet pen use. Better still, TV Paint supports pressure-sensitive tablets, with a graphic curve control for pressure settings - a must for professionals. TV Paint knows six standard file formats for loading and saving pictures: ILBM (all the Amiga formats, plus Ham), Deep, TGA, Rendition, Delta and JPEG. TV Paint's own internal format - Deep - is recommended for speed and efficiency.

TV Paint can also access MacroSystem-US's VLAB digitiser board, which supports video grabs at 1/60 of a second.

Impressions

All in all, because of the tactile way in which this program behaves, I believe it can truly be called a professional drawing and painting tool. Since I purchased TV Paint 2, the diversity of my design and illustrative work has enabled me to experiment with a wide variety of styles and the program has performed equally well to all my demands. This is not only due to its multitude of drawing and painting modes, but also to the aforementioned tac-

tile feel of the program. Unfortunately, professional programs necessitate a professional pricetag, but TV Paint's price has dropped markedly - it's now available for well under the $1000 mark.

One problem arose while working on a Big Edit file, which could definitely be improved. When calling up the coordinates panel, only page coordinates are shown - no Big Edit coordinates are accessible, which makes accurate positioning of a brush very difficult.

The manual is adequate, if somewhat light when compared with other platforms. The explanation that the multitude of 24-bit cards made it impractical to create as many manuals, is no excuse. For the professional user, every bit of information about the program and its functions is of paramount importance, and should be included in a professionally-presented manual. I would have liked colour examples throughout, as well as a more thorough explanation of how to get the most out of the alpha channel.

Many and Varied

A new upgrade of TV Paint Professional is on its way early in 1994. It will be interesting to see which new functions will be added to an already-excellent product. TV Paint currently supports the Retina, DMI Resolver, Harlequin, Impact Vision 24, Rambrandt, VisionA, and VD2001 cards, and the new release will support all EGS cards. This multi-platform approach gives TV Paint 2 a definite edge over main rival OpalPaint, which works only on the OpalVision Main Board.

I can highly recommend TV Paint 2 - it has made my work as a designer and illustrator so much more enjoyable. ■

Supplied for review by Aura Creative

TV PAINT 2 PRO

SPEED	★ ★ ★ ★	
FEATURES	★ ★ ★ ★ ★	OCS / 1.3 ✗
		ECS / 2.0 ✓
EASE OF USE	★ ★ ★ ★	AGA / 3.0 ✓
MANUAL	★ ★ ★ ★ ★	**95%**
VALUE	★ ★ ★ ★ ★	

Dudley Storey III
brings users up to speed
with the Cycle editor.

THIS ISSUE I'D like to introduce the Cycle editor, a very useful tool in Imagine. For objects with repeating or cyclical motions, such as turning gears or a walking figure, even for unique, one-off actions, the Cycle editor is the tool to use. Once again, this tutorial is based on my own experience with Imagine - an opening title for a short video I produced, featuring a helicopter flying past a logo, looping around and blasting it to bits with a cannon. To avoid repetition, this column assumes that you have read my previous articles or are moderately experienced with Imagine.

Engines of Creation

Our first task is to create the helicopter. I'll leave the design pretty much to you. There's no need to be fancy here. My suggestion would be to use a SPHERE for the cockpit (the OTHER type of sphere, if you've been following from the second Imagineer column), selecting about half the points using Select Method/Drag Box, holding down the shift key, and then stretching the points out using SCALE to form an egg shape.

Make one landing strut by JOINing three tubes in the correct orientation, copying and pasting it, and mirroring this assembly, by scaling it through the relevant axis in the transformation requester by -1. Make the main rotor by ADDing an axis and using ADD LINES in the TOP view to create the outline of the rotor; make it solid by using ADD FACES. You may want to copy this object, scale and twist it to make the tail rotor.

Ensure that the axis is exactly in the centre of the rotor assembly. For the sake of clarity, I will assume both rotors have four blades. The cannon can just be a collection of cylinders.
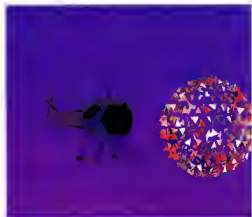
Figure 1 contains a description of a helicopter object. For subscribers, a cycle-ready object has been included on your PD Disk. Note how the helicopter is grouped in a hierarchy, with the main body the centre or parent and the group-lines branching out to smaller objects. To do this, select one object, then the second using shift-select, and use right-Amiga-G to group them. Then select the second and join it to a third, and so on. With care on your part to ensure that no object is left out of this "tree", this technique effectively organises your object.

In PICK GROUPS mode, clicking on the central object should also select the other components, through the connections of these group lines. Save the helicopter in this mode. The most important thing to maintain in the organisation of your object is the orientation of the object axes. Imagine's paths use the Y axis to align the object - that is, wherever the Y axis points is the "front" of the object for the purpose of the path. For most objects, the Y axis should thus point forward - i.e., the Y towards the bow of a ship or the front of a helicopter. If you don't follow this organisation, your object will be seriously screwed up after you bring it through the Cycle editor and attach it to a path.

Make sure the axes for all the objects grouped together in the helicopter point the same way. Finally, before leaving the Detail editor, create a sphere with plenty of facets and make it a bright, glossy red in its Attributes (high values for the red primary and shininess, a white specular highlight, and a moderate hardness.) Save this object separately from the helicopter. This will be the target for our roving gunship.

Cycles of Destruction

Now to the Cycle editor. Load the helicopter object. The Cycle editor will declare that it is not a cycle object, and ask if you wish to convert it. Reply YES. In Imagine 2.0, the Detail editor also has the capability to turn objects into cycle-ready forms. However, I have found bugs in this process and suggest using the Cycle editor directly.

Some thought is required here in animating the rotor blades. The idea in the Cycle editor is to produce an object that has repeating elements which return to their original pose, completing the cycle. If there are an even number of blades in your helicopter, it's easiest to have an "uneven" number of animation frames, and vice versa. An example will show the reason behind this. If your rotor has four blades, rotating it through 360 degrees in even increments for four frames would produce an animation in which the rotor appeared to stand still - each blade would move 90 degrees, and be in exactly the same place as the previous blade. We could rotate the rotor through 90 degrees in four frames, but this is difficult to perform in the Cycle editor, and in a full-speed animation, the blades might appear to turn ridiculously slowly. So, for a four-bladed rotor, I'll use a simple three-frame cycle.

You'll notice that the skeleton tree-like structure with which you organised the helicopter in the Detail editor, is the only thing carried through into the Cycle editor. Apart from its representation in the Perspective window, the Cycle editor ignores an object's points, faces and attributes. All it is aware of are the axes of objects and their joining together into a group.
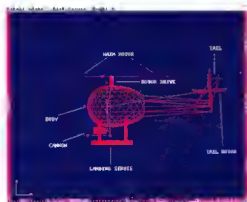
Figure 1

You should be in TWIST, OBJECT mode. GOTO frame 1. Unlike the Stage editor, Cycle counts from frame 0 for an object's animation. Centre the main rotor in one or more of the views, using Right-Amiga-fullstop, and zoom in.

Walk Like An Egyptian

You can make three major changes to an object's orientation in the Cycle editor - Pivot, Twist, and Move. Each happens in direct association with the objects grouped immediately with them. The easiest way to envision this is to imagine a human skeleton represented in the Cycle editor - its bones, the lines you see grouping your objects; its joints, the points you see also. You can only move your body by moving something at the joint. For example, with your arm at your side, to flex your bicep, you would PIVOT your arm at the elbow. This would move your forearm, the hand attached to it, fingers, etc., all in one movement. To turn your hand over, you would TWIST it at the wrist. Again, your fingers would be associated with this move. Put those two actions in separate frames or "cells" of the cycle and you have your skeleton walkin' like an Egyptian (try it yourself and see).

Your helicopter should be much simpler than a human skeleton. We need to simply TWIST the main and tail rotors through 90

degrees over three frames. Using TWIST is just like rotating an object in the Detail editor. Click and hold down the left mouse button on the end-point of the axis representing the main rotor, and move it from left to right across the screen. When you release the mouse button, you'll see a "ghost" image of the previous orientation of the rotor. Check the Perspective view to make sure that the change you've made is the correct one - the blades should have rotated about 30 degrees around a common, central axis. Make any final touches and then press Right-Amiga k to make this a key cell, fixing the move.
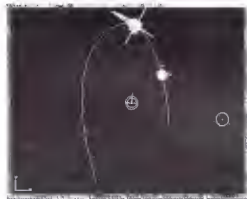
Figure 2

GOTO frame 2. You'll notice that the rotor is in the same orientation as you just left it. Rotate it a little further, just 30 degrees, and make it another key frame. You're done! Make an animation; play it in loop mode. The result will probably be much too fast, but you can slow it down in the slider of the animation controller. Although it's only rotating 90 degrees, the rotor should look as if it's doing a full spin.

Stop the animation and step through key cells again, making similar adjustments to the tail rotor, as you did to the main one. Check it by producing another animation, and, if you're satisfied, save the object as helicopter.cyc. As an embellishment, you might want the cannon to rotate like a mini-gun during the animation. Can you figure out how to do it? (Hint: you'll probably want an AXIS grouped with the cannon, slightly behind it, connecting it to the rest of the helicopter. This gives the cannon a point to TWIST around, and without it, the cannon would rotate around the entire helicopter instead!)

Balloon Barrage

To the Project editor. Create a project and sub-project. Go to the Action editor and type in 60 for the maximum number of frames. Save the changes.

In the Stage editor, add a light, load and roughly position the helicopter and the red target "balloon". The helicopter needs a flight path to follow. Go to Add Object/Open Path. You will be asked for a name for the path. Once named, the path will be added as a separate object to the Stage. You can move, scale and orientate the path like any other object, but its most interesting qualities lie buried in EDIT PATH (right-Amiga 2) mode. This option subdivides the path into control points. At the beginning, there are just two, one at

each end of the path. Select and move one control point, and notice how the path changes. You can rotate this point, which alters the relative tension in the path.

Experiment with both ends of the line, forming a smooth flight path that runs through the sphere-target, as shown in Figure 2. If you need more points to play with, PATH/SPLIT SEGMENT divides the path, between the control point currently selected and the next, with another point. Be aware, however, that too many points in a complex path can tie it up into knots with odd directions. You can extricate yourself from this by using PATH/DELETE POINT. When you're finished with the path, return to PICK GROUPS mode. You will be prompted to save the path before continuing.

Position the camera and light to take the best advantage of the helicopter's motion, referring to the Perspective view window in CAMERA VIEW mode to check. The helicopter needs to be referred to the path in order to follow it. Save any changes you've made in the Stage and go to the Action editor. DELETE the yellow position bar for the helicopter and add a new position bar between frames 1 and 60. When requested, specify a FOLLOW PATH type and add the name of the path (as it appears in the Action editor) in the FOLLOW PATH INFO box. The same for the ALIGN bar. The helicopter also needs to be told how many "cycles" or rotor rota-

SUBSCRIBERS

Dudley's Cycle-ready chopper is included on your PD Disk

tions to perform in the animation. Since the blades rotate over three frames, and the animation lasts 60 frames, type 20 in the "Number of Cycles to Perform" box that appears in the OBJECT INFO requester, when you click on the ACTOR bar of the helicopter (using INFO). While you're about it, you might want to ALIGN the camera to follow the helicopter on its attack run for a more dramatic animation, using the same method. With this done, return to the Stage editor and MAKE an animation. It should be pretty impressive, except for the fact that our gunship flies straight through the unharmed red balloon. We need to blow up that balloon!

Apocalypse Now

Make any corrections that you feel are necessary, before stepping through the animation to find the frame where the gunship lines up with the balloon, an appropriate point to start its destruction. Not only do we need the balloon to explode, but also associated light effects from the helicopter's cannon must occur.

For my purposes, I found that a light flashing on and off did the trick. You could add it in the relevant frame, add a POSITION bar and tween its position at the same rate as the helicopter's move during the balloon's destruction. Or you could make it follow its own path, or HINGE it to the helicopter. All should be fairly easy to accomplish.

For the flash effect, you could DELETE the light every alternate frame, or diminish its size or intensity of colour. Perhaps the easiest method is to apply Imagine's FLASH effect to the lightsource - I'll leave the exact details to you.

Add about ten frames to the frame in which the light starts to flash, and ADD a bar between this frame and the last on the sphere's FX/1 line. Choose EXPLODE from Imagine's F/X drawer. Keep most of the default values, except the Maximum Number of Triangle Rotations and Frame Count for Expansion. Both values should be self-explanatory - Triangle Rotations controls the amount of "spin" in the fragmented facets of the balloon as they explode away; Expansion controls the rate at which the explosion happens. You can change them to suit the scale of your own animation. I'd also suggest turning on the "Make Faces Sparkle" box.

Why start the target's destruction some time after any good pilot would have blown it from the sky? Because we're animating, and we have to follow the rules of action-reaction, or cause and effect. The gun flash before the object's destruction cues viewers that something is happening, and allows them to see the result. If the light began at the same time as the explosion FX, its effectiveness would be lost in the more spectacular explosion. The animation is ready to go. Before making it, I suggest changing the sky colour in the GLOBAL actor bar in the Action editor to a light blue. As the sky tends to grow lighter or darker in colour with altitude, sunsets, etc., GLOBAL variables allow you to change the colour at the horizon, and the destination colour for height (+Zenith) and depth (-Zenith, "below" the horizon). Try a pure blue for the horizon (0 Red, 0 Green, 255 Blue), lighter blue for -Zenith (increase the red and green values), and a darker blue for +Zenith
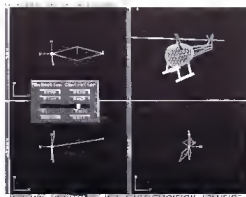
Imagine's Cycle editor

(decrease the blue value). Use a value of about 100 for Sky Blending. Remember that these values will be fixed for the duration of the animation - you don't have to extend the GLOBAL's Actor timeline past frame 1. Your completed animation should be suitably impressive.

You can learn a lot by playing with effects and changing the cinematography of the animation. I'd suggest attaching the Camera to a path for a more powerful effect, like a flying camera shot or dolly. Or load the helicopter again into the Stage, and have two gunships duelling against each other... ■

KING of the PUBLIC DOMAIN

***Thomas Scovell** reveals the path to fame and glory.*

WELCOME BACK TO the Public Domain, where quality software can be found for little more than the price of a disk. After receiving several queries on the topic, I have devoted this issue's column to how to go about producing and distributing Public Domain software.

Fame And Fortune Await?

Why distribute software in the Public Domain? The main reasons are fame, money and experience, with the first two, obviously attractive, but the latter, more realistic. Money can be made by programming PD software, but you cannot sit down, write a quick utility and expect the dollars to start rolling in. Many programmers place their software in the Public Domain simply to enable others to use it. The experience gained is reward enough. For those wanting more, concentrate on the following tips to help make your program a success.

The most difficult aspect of the whole process can be coming up with the initial idea. The key to planning a successful game or utility is originality - you will gain little from simply programming yet another tetris clone or textviewer. When devising an idea, you must obviously aim for something within your own programming capabilities. Don't set out to write a wordprocessor, if you have yet to advance beyond the "Hello World!" program stage. Next, ensure that your program will be of use to as wide a range of people as possible. A program to track the migration of the Albanian cuckoo may interest you and one or two others, but won't appeal to the majority of Amiga owners.

Quality Control

A successful program only needs to do its specified job well. Extra features can help, but often merely clutter the program. As long as your software performs its stated purpose properly, users cannot complain. A good user-

interface will help. A powerful CLI-based utility will probably not do as well as a simpler program using windows and gadgets. If your program looks attractive whilst maintaining the power, you will have a winner.

Be Your User's Friend

The most common gripe about programs is their lack of user-friendliness. Users will simply discard programs which cannot be used easily, no matter what the features. Pay particular attention to this: things that seem quite obvious to you in the functioning of the program can often be lost on users. Try out your software on others to check whether you have overlooked anything. Good programs are the product of lengthy testing.

" Programming a masterpiece is only half the task..."

Compatibility

In order to ensure the widest possible audience for your program, you must make it compatible with as many different systems as possible. If you wish to write a program that uses AGA features, you obviously cannot do much about making it backwardly compatible, but in the case of general utilities, you should endeavour to do so. A program requiring an 040, 10 Mb of memory and a hard drive will attract very few users. Try to make your software work with a minimum system, WB1.3 and 1/2 Mb. If this is not possible, make sure you state clearly in the docs what system the program does require.

Those ReadMe Files Help!

In the early days of Public Domain software, very few programs were distributed with doc files. With increasingly complex programs, and fussier users, however, doc files are now necessary. Docs should be easy to understand and logically set out, just like a manual for commercial software. Check spelling and grammar - first impressions are important. Aim to hold the reader's attention with the doc and make that reader want to use the program. How? Try listing the many uses for your program, adding humour to the text. Remember also to include information in the docs about other files needed by the program.

Tell users where you can be contacted, if you wish to receive feedback. Doc files for many programs nowadays are in AmigaGuide format - a hypertext-style system allowing users to move through the docs in a non-sequential manner, by clicking on highlighted text. This simplifies learning how to use a program, worth noting if you have the opportunity to do your docs in this format. Remember to add to the doc file information on the legal status of your program. This is vital to its success.

Freeware, Shareware, Or Beerware?

After writing your program, you must make an important decision as to its legal status. If you want to make money from it, you need to place restrictions on distribution and usage. If, however, you are looking for publicity only, simply state that the program is freeware in the doc file. The most common method of distribution for money is shareware. In the doc file, inform prospective users that they must pay a certain sum for use over an extended period - either a fixed amount or the figure they think it is worth. Remember that asking for a large amount will reduce the number of people who pay - don't be greedy when setting the shareware fee. In fact, only a small percentage of people pay shareware fees, so it is best not to scare them off. In return for a fee, you should offer an incentive, which could include sending all who register a version with enhanced features or a later version of the program free of charge. You can, of course, specify a large range of different requirements on your program. Make it Charityware and have users send money to your favourite charity, or Beerware and have them send a six-pack your way. The choice is up to you, determined by what you wish to achieve for your efforts.

Distribution Methods

Programming a masterpiece is only half the task. You then need to get it to prospective users. Several methods exist, all of which

have different advantages.

Cover Disks

If you think your program is particularly good and deserving of the widest possible audience, some of the best options are magazine cover disks and subscriber disks. Many magazines offer a one-off payment for placing programs on their cover disk. Be warned, however, that in doing so, you give up the rights to your program and cannot make further money from it. Other magazines, such as ADU, offer the chance to distribute software on their subscriber disk, without stipulating conditions. If you place a shareware program on a disk such as the ADU subscriber disk, it will be widely distributed and, hopefully, some who use it will pay the shareware fee.

The BBS Way

Those with modems have the option of distributing software via Bulletin Boards. Simply
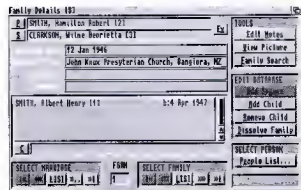
upload the file on to local BBSs and let other users take it from there. Those who download it will hopefully go and upload it on other Boards, spreading your file far and wide. Those without modems can also use this method, by sending a program to a BBS sysop and requesting placement on their system. Most sysops should be happy to do this.

PD Libraries

The most common method of distributing programs in the Public Domain is to send them to

a PD library. Place your program on a disk and send it to a library asking for placement in their catalogue. They may either leave your program on a disk by itself or, as is the case

with smaller programs, place it on a disk with other similar software.

Distributing The ADU Way

The final method of distributing your masterpiece is via ADU. If you send your program to me, C/- ADU, I will take a look, suggest any improvements necessary and review it in this column. I will also send it to Australasian PD libraries and place it on Bulletin Boards on your behalf. This is an effort to encourage local developers, which costs you nothing - so send in today!

Some Fine Examples

Below I have taken a look at locally-produced Public Domain - fine examples of what can be achieved.

Arjay by Robbie Akins

Arjay is a genealogical record-keeping program, which allows the recording of data about your family tree in database format. The Wellington programmer has released this program as freeware, seeking no fee and placing few restrictions on usage. The doc files - in AmigaGuide format - are an excellent example of what makes a successful program. Searching for information on specific parts of the program is extremely easy, due to the format used, and many options and preferences are available. Particularly impressive is an alternate palette selector, allowing you to change screen colours just by selecting the name of a set of colours. Other simplifying features include a library install program. Arjay's ease of use and freely-distributable status should see this program spread widely among the Amiga community. A good guide to follow when writing your own PD software.

Fullview by Jonathan Potter

Fullview is a text and picture viewer which has become extremely popular among Amiga users around the world, released by its Australian programmer as freeware. The simple idea behind Fullview makes it easy to use and the wide range of options gives it power. Options include loading powerpacked text, viewing pictures, printing screens of text or whole pages, and easy movement through files. Fullview proves that well-executed, simple programs can gain just as much of a following as the more complex.

SysInfo by Nic Wilson

SysInfo, the de facto standard Systems Information Program for the Amiga, supplies valuable information on your Amiga system, which allows you to compare it with other

systems. It lists the type of chips your Amiga uses, your library and device versions, memory, and expansion types. Queensland programmer Nic Wilson has released the pro-

gram with certain restrictions as to distribution. The doc and icon files must accompany it unchanged and no profit can be made from it. He also suggests a donation for use of the program. This method of distribution enables him to gain credit for his work, while still allowing as many people as possible to use it. Those who wish for similar rewards cannot go wrong by following his example.
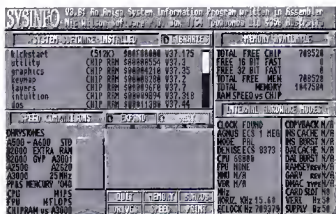
As The Sun Sets

Next issue the column will be back to its regular format, with reviews of the latest that the PD scene down under has to offer. Till then, if you have any comments or need some help, contact me, C/- ADU or via my Fido point on 3:772/125.5. ∎

LIVE
LEARN

With Commodore Education's
Russell Robson

WELCOME TO THIS issue's educational column, packed with reviews of new software from around the world, including new releases from two development teams in Australia.

Australia

Martin Fitzgibbons and his colleagues at Rush Software are one of the most active software teams in the world at present - 24 titles currently available, with many more to come. All software is competitively priced, and Rush Software actively supports the concept of site licences for school use. While many Rush releases are aimed at school use, most are equally as useful at home, giving children the chance to expand their learning outside the school environment.

Rush Maths 2 - Sideshow Alley
Rush Software, Australia
Ages 7-12
Price NZ$79.95, A$49.00

Rush Maths 2 is the second in the Rush Maths series, containing four related programs with a "Day at the Show" theme. The player is given spending money and must win as many teddies as possible with that amount. The four sections are Puzzle Towers, Shooting Gallery, Ball Drop and Ring That Bell. Skills covered include problem-solving, number-sequencing, lateral thinking, and order of operations, as well as answering sums using all four operators +,-,x,/. The program prints achievement certificates (colour optional). Like all Rush Software, it installs easily on a hard drive and runs on all 1 Mb Amiga computers.

Galactic Quizmaster
Rush Software, Australia
Ages 6-11
Price NZ$79.95, A$49.00

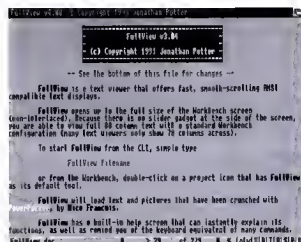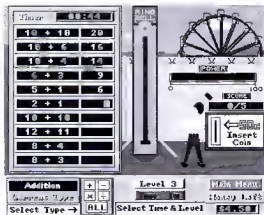Galactic Quizmaster is based around the idea of a game show, with each player given 10,000 credits at the start. Players take turns at selecting a category, risking credits and answering a multiple-choice question. The higher the risk, the higher the return or loss. The winner is the player at the end of the game with the most credits. All questions are editable, allowing teachers to use their own.

The program installs easily on a hard drive and comes with an excellent manual.
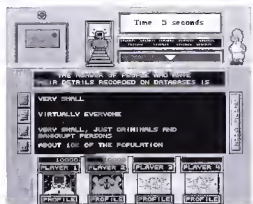
Find-A-Word Wizard
Rush Software, Australia
Ages 6 and over
Price NZ$79.95, A$49.00

The Find-A-Word Wizard program takes the difficulty out of creating the type of Word Finder puzzles found in many puzzle booklets. Puzzles can be easily played on screen. Find-A-Word Wizard also allows word

puzzles to conform to shape patterns, which can make for some very interesting effects. Words can be placed horizontally, vertically, and diagonally, as well as forwards and backwards i.e., any way you like!

While somewhat narrow in its application, this program must be considered environmentally-friendly, as puzzles can be played on screen, saving valuable paper. Overall, another fine effort from the team at Rush Software.
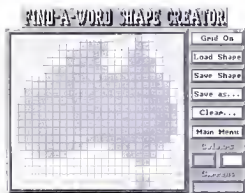
Crossword Wizard
Rush Software, Australia
Ages 7 and over
Price NZ$79.95, A$75.00

Crossword Wizard is, strangely enough, a program for creating crosswords. While other packages have tried to do the same, few, if any, on the Amiga have achieved substantial results. Crossword Wizard succeeds where others have failed.

The program allows for the easy creation and playing of crossword puzzles. Creating a crossword is as simple as typing in a word and placing it on the screen, and Crossword Wizard will ensure that all further words fit in. Those that don't will be stored until space is found. Once finished, the crossword can be either played on screen or printed to paper.

Unlike other Amiga crossword programs, Crossword Wizard prints well, producing high-quality results. Needless to say, it also installs easily on a hard drive.

DPTute
TOAD Software, Australia
Price NZ$56.00 (approx.), A$45.00

New release DPTute aims at teaching students and teachers alike to use DeluxePaint, which, for some, can be a frustrating task. The program provides a simulation of the DPaint screen. Users can select any tool or menu on the screen and receive information on that item.

While simple in its approach, DPTute does a good job of introducing users to the Deluxe-Paint program. Well presented, it installs easily on any Amiga system. A good, first-time effort from TOAD Software, with future releases hopefully in the pipeline.

United Kingdom

The United Kingdom is, without doubt, the most active Amiga area in the world, where the Amiga is, arguably, the most popular

home computer. With a market of more than a million, it follows that good educational software should originate there. Admittedly, not all - in fact, very little - has found its way to New Zealand. But this is set to change.

Merlin's Maths
Europress Software, UK
Ages 7-11
Price NZ$100.00 (approx.)

Maths Wizard - a program which many may know as king of the hill in middle and senior school mathematics software - faces a challenge from Europress Software's new release.

Where the Fun School series aimed to cover broad areas of the curriculum, Merlin's Maths is part of the new Fun School Specials series, which aims to expand on specific areas. The program takes the form of a series of activities based around Merlin's Castle, where children select their choice by clicking inside different castle windows. Activities cover different areas of the curriculum, including the four main operators (+,-,x,/), as well as fractions and ratios.

Levels are fully adjustable, with all activities presented in a colourful and cheerful manner. Unfortunately, as with most Europress releases, Merlin's Maths does not come with a hard drive-installable program, although it can be installed on a hard drive with some adjustment. (Contact Commodore for details.) Overall, an excellent package, representing good value for money.

Spelling Fair
Europress Software, UK
Ages 7-11
Price NZ$100.00 (approx.)

As its title suggests, this program assists children learning to spell. Spelling Fair takes a novel approach in providing children with a number of activities based on a "fair". Language tasks increase in difficulty as pupils progress.

As well as teaching basic spelling skills, the program also points out common differences (words pronounced the same, but spelt differently), such as their, there, they're etc., which makes it unique in the Amiga world. All questions are fully adjustable, as are word lists, which teachers can edit and change to suit their own needs. This also enables the program to be used where English is taught as a second language.

Like other Europress Software products, the program is easy to use for students and teachers alike, but cannot be easily installed on a hard drive.

All in all, Spelling Fair represents very good value - towards the top of the list for schools looking for language software.

ADI Junior Series
Europress Software, UK
Ages 4-7
Price NZ$100.00 per unit (approx.)

This series, another expansion of the Fun School concepts, aims to concentrate on specific areas of learning, including counting, reading and maths, to name but a few.

Each of the ADI series shares a common "environment", in which children select activities in a manner similar to that of Paint and Create. This allows children to transfer easily from one ADI program to another, without learning a new set of difficult commands.

The programs progress through a series of levels, increasing in difficulty as children learn more. All colourful, attention-grabbing packages. Skill levels are fully adjustable by the teacher.

While programs individually are relatively expensive, they do provide solid learning concepts.

Contact Commodore for more details.

That's all for this issue. Until next time, happy learning! ∎

Russell Robson
Commodore Education New Zealand
(09) 415-7667

```
□ AmigaShell                                          □□
> echo >con:8/8/48/288/Scripting/Auto/Ghostwriter/ByDeadline/Magic "G*In↑"
you what?
>
```

SHELL SHOCKED

Jarno van der Linden *finds the answers to some fairly fundamental questions... in the Startup-Sequence!*

THIS MONTH I will take you on a guided tour through the script of all scripts: the Startup-Sequence.

Start Here

The Startup-Sequence lives in the S directory of the disk from which you boot and is executed when the computer starts up. The purpose of the Startup-Sequence is to set things up for your work environment. It is also responsible for launching Workbench. A typical WB2.0 Startup-Sequence looks like this:

```
 1.  c:setpatch >NIL:
 2.  c:version >NIL:
 3.  addbuffers >NIL: df0: 15
 4.  FAILAT 21
 5.  resident >NIL: c:List pure add
 6.  resident >NIL: c:Copy pure add
 7.  resident >NIL: c:Assign pure add
 8.  resident >NIL: c:Execute pure add

 9.  makedir ram:T ram:Clipboards ram:env
     ram:env/sys
10.  copy >NIL: ENVARC: ram:env all quiet
     noreq
11.  assign ENV: ram:env
12.  assign T: ram:t ;set up T: directory
     for scripts
13.  assign CLIPS: ram:clipboards
14.  assign REXX: s:
15.  if exists sys:Monitors
16.  join >NIL: sys:monitors/~(#?.info) as
     t:mon-start
17.  execute t:mon-start
18.  delete >NIL: t:mon-start
19.  endif
20.  BindDrivers

21.  setenv Workbench $Workbench
22.  setenv Kickstart $Kickstart
23.  IPrefs
24.  echo "Amiga Release 2. Kickstart
     $Kickstart, Workbench $Workbench"

25.  conclip
26.  mount speak:
27.  mount aux:
28.  mount pipe:
29.  path ram: c: sys:utilities sys:rexxc
     sys:system s: sys:prefs sys:wbstartup
     add
30.  if exists sys:tools
31.  path sys:tools add
32.  if exists sys:tools/commodities
33.  path sys:tools/commodities add
34.  endif
35.  endif
36.  if ${sys/keyboard} NOT EQ
     "*${sys/keyboard}"
37.  setmap ${sys/keyboard}
38.  endif

39.  if exists s:user-startup
40.  execute s:user-startup
41.  endif
42.  rexxmast >NIL:
43.  LoadWB
```

Note that I have numbered each line for the purposes of this article only - the figures are in no way part of the script. The Startup-Sequence on your Workbench disk may differ, depending upon the version you are using, but essentially the process is the same. Let's start, therefore, where all scripts begin - at the top.

An Imperfect World

1. The world isn't perfect - not even Commodore. And with something as complex as an Amiga, someone is bound to find a bug, just when mass production of ROMs has begun. The only alternative is to provide a software patch, like SETPATCH, which corrects last-minute mistakes. To see exactly what it patches, run it again in a Shell window.

2. VERSION advises which version of Workbench as Kickstart you are using. More importantly, it sets the Workbench and Kickstart variables, which, in turn, will be used to set corresponding environmental variables, a term I'll expand on later. They are very similar to the variables used in scripts ('set >NIL: var ?').

3. Floppy disks are slow. Every time you want to run some small command, it has to be found on the disk and read into memory (possibly from all over the disk). ADDBUFFERS attempts to hasten the process by providing memory where the last file to be read (or part of it) will be held. If the file fits entirely into the buffer, no disk access is needed. Here, fifteen buffers are reserved for the internal disk drive, which also speeds up directory listings in both Shell and Workbench.

You will have noticed that all these commands redirect their output to NIL: ("the bit bucket"). From WB2.0 and upwards, the initial Shell window will open only when there is something to output. If no output occurs in the Startup-Sequence, you will never see a Shell window and will be put straight into Workbench. Furthermore, all this "Yes, I worked perfectly" output looks untidy and is best left out, as are many other commands in the Startup-Sequence.

4. Faulty commands return an error number. The more severe the error, the higher the number. If the error number comes above a certain limit, the script will grind to a halt with a "Command Failed" error message. FAILAT sets this limit, which is fairly high in the Startup-Sequence, to ensure that the whole script is executed, even if something does go wrong (like a missing file).

5-8. Back in the bad old days of WB1.2, whenever you ran a command, it had to be read from the Workbench disk. To make use of the CLI (as the Shell was called back then),

a second disk drive was essential. Even so, it was tricky to copy files between two disks. How much easier life would have been, if some commands had been in memory, rather than the C: directory. The answer came in the form of RESIDENT, which puts a program in memory. When you want it run, Shell will first check the resident programs to see if it's there. If so, it runs straight from memory; if not, Shell carries out the usual disk accessing. To see which programs are resident, type "resident" in a Shell window. Many are INTERNAL - i.e., built into the operating system.

What Am I?

9-13. These set up work directories on the RAM: drive (a piece of memory that acts as a disk drive). The "T:" directory is used by Shell to temporarily store scripts it is working on, and could also be used by other programs to store temporary files. Clipboards are used (or rather, under-used) to hold data, such as blocks of text. The theory is that you can, for example, block text in a text editor and paste it into a database program. The clipboard is used as an intermediary: in practice, few programs support it. The environmental variables are stored in "ENV:", with the "sys" drawer holding current preference settings. In line 10, it is filled with the stored preference settings on disk. Selecting "use" in a preference program alters the settings on the RAM disk. Only when "save" is selected, will settings on the Workbench disk be updated.

14. The S: directory also doubles as storage for ARexx programs. Just as C: is the directory for Shell, REXX: is the directory for ARexx.

15-19. The operating system likes to have info on your display capabilities, which is usually put in the Monitors directory. A Monitors file or directory in SYS:, which defaults to the boot disk, is able to take all the files in the Monitors directory and join them into one - an example of how the T: directory is used. All the files in this Monitors directory are actually a collection of Shell commands. Having joined them all together, we can execute them all in one go, instead of having to go through them individually (which the standard Shell does not support anyway). When executed, the temporary file is

deleted, as it is pointless to fill up memory with files that won't be used again.

20. This is an obscure command, which, to the best of my knowledge, searches for any non-auto configuring hardware expansions and makes the Amiga aware of them.

Green Variables

21-22. Here are the environmental variables. Remember how you could set a variable in a script by SET? SETENV is similar. Why two different commands for what appears to be the same thing? SET is a feature of Shell, and only Shell can access the variables it creates. SETENV, on the other hand, saves its variables to the ENV: directory (as created in lines 9 to 11). The great advantage is that other programs can now access these variables. But don't rush off to change all SETs to SETENVs. Unlike SET, environmental variables (as the name suggests) describe a certain aspect of the Workbench environment, (such as the preference settings in the ENV:SYS directory).

"Now, what was that file called? ...FlippleDiFlap-FlopOinkOink?!"

In these lines, the variables made by the earlier call to VERSION are copied to the identically-named environmental variables, as they describe features of the environment (the version numbers).

23. WB2.0 introduced many changes and additions. For example, the preference program was split into a dozen separate, small programs, the idea being that programmers could easily add a preference program. Furthermore, preference programs no longer change the Workbench itself. Instead, they only alter the settings in the ENV:SYS directory, and maybe also in the ENVARC: directory on the Workbench disk, if the "save" button is used. A File Notification system was also introduced, with which a program could ask the OS to keep an eye out for changes in one or more files or directories. OS will then notify the program accordingly. Put the preference system and the file notification together, and you have IPrefs, which asks the OS to monitor any changes in ENV:SYS. When a change occurs (through a preference program), IPrefs will attempt to alter the Workbench to reflect that change - e.g., a different font, higher resolution, or different colour. You could say that the preference programs are simply passing the buck.

24. This prints out a standard header containing the current Kickstart and Workbench versions. This is the first time there is some output. So, at this stage, the initial Shell window is opened. In fact, this is the only output that will occur in this Startup-

Sequence. Personally, I comment this line out (by putting a semi-colon in front of it). That way no output will occur and I won't see a Shell window pop up to tell me something I already know.

Where Am I?

25. "Now, what was that file called? Let's do a DIR and find out - FlippleDiFlapFlopOinkOink?! If only I could grab that name from the screen and paste it at the cursor!" Another good reason for 30.7% of you (according to last issue's survey) to upgrade to WB2.0 or better. CON-CLIP allows you to block text from a Shell window and copy it to the prompt. Instead of having to type that long file name, just click, drag, Amiga-C, Amiga-V, and voila!

26-28. MOUNT loads a handler for a device, which does not have to be real, such as a hard drive. The "speak:" device, for example, uses the "narrator.device". This handler takes all the files you send to the SPEAK: "drive" and puts their contents through the SAY command. The AUX: device is used for sending files between two Amigas connected through the serial port. PIPE: is used to hold output from one command while another program is reading it - a bit like output redirection, but with certain advantages (it uses buffers instead of sending output straight from one command to another). I'll speak about pipes in a future issue.

29-35. These lines set up a search path. When you run a program or command from a Shell, it will check the current directory. If the program is not there, it will look in each directory in the search path, until it is found. Type "path" in a Shell window to see the whole path.

36-38. These lines check if the keyboard environmental variable is set. If so, the keyboard mapping will be set to it. Note how the brackets are used to group the directory and the name of the variable. As you might have guessed, the keyboard variable is found in the "sys" drawer in ENV:. If the variable doesn't exist, "${sys/keyboard}" is equal to exactly that string. The IF statement checks this condition. The star escapes the dollar sign. That means that Shell won't interpret the dollar sign as being an indicator of a variable, but instead, will take it as a character, as in

some of the tricks mentioned in my first article in ADU 4.

Home Stretch

39-41. Hands off the Startup-Sequence! is the message in these lines. If you feel you need to add something to the Startup-Sequence, don't. The User-Startup is there specifically for that purpose. Maybe you want to expand your path, add a few more ASSIGNs, or run some program that doesn't feel comfortable in the WBStartup drawer. Don't forget that if you want to run a program in the background, and it doesn't detach itself (i.e., Shell just sits there waiting for the program to stop), use the RUN command.

42. ARexx is great and ADU doesn't have an ARexx column (hint, hint!). REXXMAST is the master program which directs all ARexx material.

43. It is probably a good idea to load up the Workbench at some stage - not surprisingly, with LOADWB.

44. Now that Workbench is open, we don't need the initial startup Shell. Even if the Shell window hasn't opened, because there was no output, you must close it. If you don't, the Startup-Sequence will end, a prompt will appear and, you guessed it, the Shell window will pop up.

Finish

There we are - the end of the Startup-Sequence, and the beginning of Workbench. Being a computer is hard work! ∎

terminology

THE VIDEO arcade

by Brian Pearse

IN MY PREVIOUS article (ADU 5), I discussed the art of the storyboard, one of the basic fundamentals of successful video or movie production, which, with practice, becomes second-nature. Most storyboarders, in time, develop their own unique style - as the seed of an idea grows, so the storyboard takes shape.

In future issues, we will discuss storyboarding in greater depth, but for now, and for those confused by the technical language used in video reviews, here is a rundown on the most common terms.

Aspect Ratio

Your television screen is a rectangular area, currently three-quarters as high as it is wide. This is the "viewing aspect ratio", given as 1.33:1. The term "widescreen" refers to an aspect of 1.85:1, the most common ratio used in the film industry (see below). If you create a picture with the correct aspect, the image will not become distorted when viewed on a TV screen. Aspect ratio should not be confused with width and height in pixels.

format has a resolution of 240 lines, explaining why it appears fuzzier than normal television, which has a resolution of 600+ lines. The television test pattern allows a visual check of resolution via the vertical black/white bands across the centre.

Frames and Fields

A television frame consists of two fields, and, for PAL, each field is drawn every 1/50th of a second (50 fields/sec = 25 frames/sec).

Interlacing

The entire picture is made up of horizontal lines drawn left to right across the screen, from the top left to the bottom right corner. With television and video (and computer when using an interlaced screenmode), each field consists of alternate lines i.e., the first field has the odd numbered (1,3,5 etc.) lines, and the second field, the even lines (2,4,6 etc.). The transmission of one field at a time is known as interlacing. Our eyes can pick up the flickering of the brighter lines, which appear to jump as each field is drawn, but

completely.

In the (ideal) Y/C format, the colour information (C) is never combined with the luminance (Y) or synchronising data (H and V sync) - a technique copied from the component format discussed next - resulting in better and sharper colours. However, even in the Y/C format, colours are still less than ideal.

Switching to the component format (sometimes referred to as YUV or Y/R-Y/B-Y) however, gives an almost-perfect result, as, distinct from the above methods, the three colours (red, green and blue) are not combined at all. In fact, only the luminance, and the red and blue colour data are used - the green data being a component of the luminance minus the red and blue, giving the three signal connections as Y/R-Y/B-Y. Again, the luminance is recorded separately on to tape. As a matter of interest, the colour television signal transmitted to our sets at home is broadcast in this format, which explains why the quality is so good. The drawback is, as always, price; even a low-spec Betacam player/recorder costs more than NZ$25,000.

When a video camera records a picture, three "colour guns" are employed, one each to record the brightness of the red, green, and blue colours (the primary colours) from the scene. In the above systems, this information is encoded in some way; in the analogue

1.33	1.66	1.85	2.35
TV aspect (aka Academy or Pan-and-Scan)	Standard 35mm film stock ratio	Widescreen format	Cinemascope or Panavision

NTSC, PAL

NTSC is an acronym for National Television Standards Committee, the TV and video standard in use throughout the USA, Canada and Japan. PAL, an acronym for Phase Alternate Line, is the standard used throughout the UK, parts of Europe (e.g., Germany), Australia and New Zealand. The two are completely incompatible, both in transmission of colour, and horizontal and vertical synchronising frequencies. Common to both is the use of vertical interlacing.

Resolution

This more technical term, used in professional video or television, refers to the number of lines which are visually discernible across the total width of the screen. It has a direct bearing on the sharpness of the picture. The VHS

since we cannot discern movement occurring above 22 times every second, we see only the complete frame.

Composite, Y/C, Component, Analogue RGB

Transferring picture information between each machine has, in the past, been through two wires. All picture information - including brightness (luminance), colour and synchronising data - is encoded into a stream of data which is passed along the first wire; the second acts as the ground connection throughout all equipment used. This is the composite signal, stemming from the old black and white television days. The disadvantage of this format lies in the fact that the combination of colour and brightness information causes the colours to bleed into each other, or drop out

RGB format, it is never combined, but passed to the television or recording device along three different wires, one for each colour. The synchronising data is also passed along the green colour information wire. Again, a common ground wire is used.

Betacam, M2

Both are video formats used predominantly in the professional field, yielding a superior-quality, colour picture over the composite and Y/C formats, due to use of the YUV or component format mentioned above. Betacam (now Betacam SP, for Superior Performance), invented by Sony, remains the most popular format throughout the world. M2, manufactured by Matsushita (who also manufacture the Panasonic range in consumer VCRs), is far less popular, although it has been adopted

by the BBC in the UK.

Vectorscope

While on the subject of colour, it is obviously beneficial to have all colours at their correct hue. Although many viewers are not too knowledgeable of, or disturbed by, slight colour variations, sometimes - unless there is a means of measurement - a bias towards another shade can cause unsightly colouration or tinting e.g., a shift from red to green can cause skin colour to look sickly, especially in the NTSC system, where colour stability is more critical. A vectorscope will display the relationship of each colour against a reference; the display has marked boxes within which each colour should lie. Any shift in hue causes the associated colour to move out of its assigned box.

If, for example, a signal generator sends out equal amounts of red and blue i.e., magenta, the signal reaching the recorder must also include equal amounts of red and blue, to prevent a shift toward one colour or the other. With composite or Y/C, the likelihood of colour shift is remote, with only one cable for all shades. In the component or RGB system, however, different cable lengths for each hue or incorrectly-aligned equipment can result in colour changes.

Timebase Corrector

I have previously emphasised the importance of stabilising the video signal during dubbing, or, more importantly, when recording from two or more sources simultaneously e.g., fades and wipes. The preferred type to look for is the infinite-window timebase corrector, which excels under most conditions, and has the added advantage of being able to freeze a complete frame on screen i.e., producing a perfect still. Both DPS and GVP manufacture a timebase corrector for the PAL Amiga, and IVS have talked about releasing a model in the near future.

Chrominance and
Luminance Keying

"Keying" is replacing areas of the original picture with a second video signal *(see colour zero)*. A Luminance keyer works on the brightness of the picture; adjusting the effect gradually increases the amount of video showing through the brighter areas. A Chrominance keyer uses the hues of a picture (usually a particular shade of blue). Whenever this shade occurs in the picture (usually as a background), it is replaced by the video signal applied to the second input of the Chrominance keyer. Its most common use is during the weather forecast on television; the host stands in front of a blue screen, while the weather map appears on the monitor wherever his/her body does not cover the screen.

Frame Buffers,
Frame Grabbers & Digitisers

When you wish to record a programme on video, you no doubt set up your trusty VCR and insert a tape, for playback at a later date. Playback, slow motion, freeze framing...capabilities vary with models, but more

advanced editing is outside the realms of possibility. Even the fanciest VCR cannot add or subtract colour (colourise), or paint moustaches on each of the character's faces! With the right hardware and software, however, your Amiga can.

A frame grabber, as its name implies, grabs a frame, then stores it in its own memory (called a memory buffer). The cheaper types grab only one field *(see frames/fields)*, while

...will this new chipset make even 32-bit boards redundant?

pricier models grab a full frame. The latter result in a frame with more detail and little or no interlace jitter, but have a price tag to match the quality, since they require more memory and need to grab two fields in succession. Another part of the circuitry then converts the picture into a format the computer can recognise (digitising), and, in many cases, compresses this data further to consume even less memory space. The price of the board determines the quality and speed of digitising and compression, and the more expensive models utilise special processors e.g., C-Cube's JPEG compression chip, to allow real-time grabbing, digitising and compression.

The cheapest boards will only grab a field every five to ten seconds and rely on the host computer's processor to compress and transfer the image to disk. For high-end users, boards are now becoming available which can capture and compress live incoming video to hard drive. Most of these boards use JPEG compression, which, although quality-reducing in the past because of the small file sizes required, now performs quite adequately. This

is due to improvements in hard drive transfer speeds, and means that JPEG compression at 6:1 can now be used, which provides little noticeable loss in picture quality. Another more recently developed compression technique is MPEG, which can represent PAL broadcast-quality video at just 4 Mb per second, compared with the 50 Mb per second which is required for the same raw data. *(Refer to the MPEG feature in ADU 6 for more information on this format -Ed.)*

Currently, the native Amiga, at best, can only display a maximum of 262,000 colours from a palette of 16.8 million. To go beyond this requires a hardware device called a "frame buffer", which, like the boards above, resides in the video or a Zorro slot, and allows an Amiga to display the full 16.8 million (24-bit) colour palette. Instead of a 24-bit image being dithered to the optimum 262,000 colours, it is transferred into the memory on board the frame buffer, and displayed via the buffer's output RGB socket. The advantage of having such a buffer in the video socket is that it can simultaneously display the native Amiga graphic image, and the 24-bit image through the same output. The disadvantage is that the size of the image is limited to that of the Amiga's, although hi-res, extreme over-scan, interlaced 24-bit is more than adequate for any current video application. With the likelihood of a new Amiga chipset late this year, with an address space of 8 Mb or more, future boards will have no problem displaying 1280x1024x24-bit screens. My only question is... will this new chipset make even 32-bit boards redundant?

Alpha channel (32-bit)

Currently, photographic-quality images on computer utilise a palette of 16.8 million colours (24-bitplane depth), often referred to as true-colour images. A photographic-quality, black and white image has 256 levels of tone, from, and inclusive of, black to white, which equals 8 bitplanes. If it were considered

OpalPaint's Alpha channel function (above) can be used to great effect for image composition.

*Is this the fastest Zorro II display card ever? **Matthew Buchanan** investigates..*

Picasso II

Expert Services ■ NZ$1595 ■ A$1195

IT TOOK ONLY a matter of minutes to remove the case of my A3000, and install the Picasso II board into a vacant Zorro slot. Replacing the case, I attached the supplied pass-through cord - like the EGS Spectrum (reviewed ADU 6), the Picasso II is designed for use with one monitor (all Amiga screens are passed through the card, straight to the monitor) - powered up, and inserted the install disks.

An 800x600, 256-colour Picasso Workbench is possible on any A2000 or A3000

Installation

The only information required of me during installation was the maximum horizontal refresh rate of my 1950 monitor, which, according to its spec sheet, is 35kHz. Picasso II's software consists of a monitor file (similar to those found in the Devs/Monitors directory of your Workbench disk) and a screenmode promotion utility, ChangeScreen. With the monitor file installed, several Picasso screenmodes are added to the display database. These can be used by any OS-compliant software which allows a screenmode to be selected.

Screenmodes

Of the half-dozen screenmodes supplied for 35kHz monitors, only those up to, and including 800x600, appeared stable on my

The Picasso II comes complete with a cut-down version of TecSoft's excellent TV Paint software, which will run in a Picasso screenmode of your choice. Check out page 20 for a review of the full-blown version...

1950. The rest suffered from nasty jitter, usually an indication that either the monitor or the display hardware is being pushed past its limits. If you've ever displayed super hi-res on a non-AGA Amiga, you'll know what I'm talking about. Even lowering my maximum refresh rate to 31kHz did not alleviate the problem.

The fact that settings for each breed of monitor are hard-coded into a monitor file is rather short-sighted, in my opinion. Experienced users should be given the option of editing such modes, to squeeze that extra little bit of performance from their particular set-up, in much the same way as EGS users benefit from their DisplayAdjust utility.

The Picasso II is able to display all screen resolutions (its maximum is 1280x1024) in up to 256 colours, for use with Intuition-based software. An unfortunate limitation of just 1 Mb of display memory (DRAM) restricts 24-bit screens to no larger than 640x480, and for this price, I would definitely expect more. Two extra true-colour modes are available - 15 and 16 bits (32,768 and 65,536 colours respectively) - for use with any software which accesses the board directly. On this

note, render modules are supplied for both ImageFX and ADPro, as well as a complete range of picture utilities, including JPEG, GIF, IFF and MPEG viewers. Another utility not mentioned in the decidedly-average manual is MainActor, an animation utility with full 24-bit compilation capabilities.
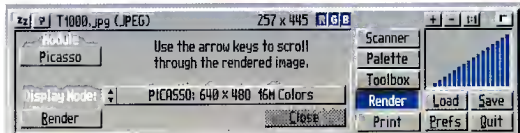
Mode Promotion

For programs which do not support selection of an alternate screenmode, ChangeScreen is a useful addition to the Picasso's software. ChangeScreen is designed to force non-configurable programs to open Picasso screens. A translation from the German original, the manual is, at best, repetitious and ill-informed. In the section describing ChangeScreen, it states that every time an Amiga custom screen is opened by an application, a requester is displayed asking whether this screen should be promoted to one of the Picasso's modes. After exhausting my hard drive in an effort to produce said requester - without success - I manually entered "ADPro" into ChangeScreen's listview, forcing it to open a 320x240 screen (no PAL modes here, I'm afraid). This was successful, and most subsequent applications launched resulted in a promotion requester.

The user has the option of promoting a program once, always or never, or of cancelling the requester, and manual edits of ChangeScreen's settings are possible at any time. ChangeScreen's other function is to automatically promote every instance of a particular Amiga screenmode to a Picasso mode. Installed along with the Picasso monitor file in my Devs/Monitors drawer are Multiscan and PAL monitor files.
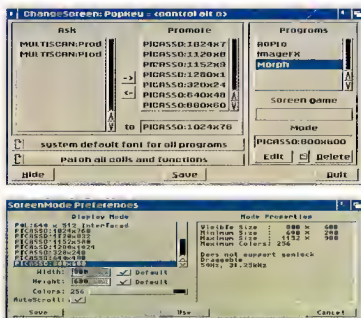
Picasso II's ChangeScreen software, and the Workbench Screenmode Prefs

Unfortunately, none of the PAL modes were recognised by ChangeScreen, rendering this part of the program unusable. The Picasso II will operate under Workbench 2.04 or higher, but ChangeScreen requires Workbench 3 to run.

Speed

Despite being limited to Zorro II transfer rates, the Picasso's speed is good. The hardware uses planar graphics (as opposed to the Spectrum's chunky graphics) which give a definite speed advantage from one to five bitplanes. In its 8-bit and true-colour modes, however, the Picasso II is noticeably slower than the Zorro III Spectrum. If your main use for a display card is as an Intuition enhancement (i.e., for modes up to 256 colours), the Picasso II is probably a better bet.

Workbench runs very well on the Picasso II, which supports the Amiga notion of

"draggable" screens - almost. With mode promotion in action, the screenmode of the frontmost screen is applied to any screens revealed when that front screen is dragged down. Rightful screenmodes are restored if

the front-to-back gadget is used. ImageFX will open a Picasso preview screen, but the toolbox screen completely obscures the preview screen while visible - another indication of the Picasso's not-quite-perfect compatibility.

With a recommended retail of NZ$1595, the Picasso II is on a par - costwise - with other boards such as MacroSystemUS's Retina and GVP's Spectrum. A software

upgrade is on the way, which hopefully should rectify a few of the annoying problems presented by ChangeScreen. Several times while using Workbench, my mouse pointer vanished from the face of the earth, only reappearing when I clicked on the

background. This problem has also been addressed by the upgrade.

The Picasso II is easy to use, despite the manual's shortcomings. Software support is in abundance, an important factor to consider when purchasing such a card. With drivers for ImageFX and ADPro, and support from new programs such as the animation utility, Magic Lantern, the Picasso II looks set for a solid future in the low-end graphic enhancement arena. ∎

The Picasso II render module for GVP's ImageFX

The complete outline font utility just became the complete font utility. **Matthew Buchanan** *checks out the latest from Soft-Logik.*

TypeSmith 2.0

Soft-Logik ■ NZ$375 ■ A$249

FOR THOSE IN the publishing industry, TypeSmith has been an indispensable tool since its first release, both as an outline font designer, and (probably more so) as a font conversion utility. In late 1993, Soft-Logik released version 2 of TypeSmith, which now includes bitmap editing of fonts, autotracing of imported bitmaps, increased coverage of font formats, better preferences and generation of hints, while retaining all the features which made the original so useful. (Hints generation is supported in both the Intellifont and PostScript Type 1 formats, and involves storing information within a font, providing guidelines for the bitmap display of characters at low pixel resolutions, so as to best preserve the look of the font.)

Installation

TypeSmith 2 requires a minimum configuration of two floppy drives (or hard drive), 2 Mb of total system memory and Workbench 2 or higher, in order to run. It installs from one floppy disk, and includes a registration procedure when first run, which embeds the owner's name within the program, so as to deter piracy. All TypeSmith 2's preferences are stored in its icon as tool types. This is a blessing, for if you are faced, as I was, with a "Can't open screen" requester (I can only assume that TypeSmith defaults to an AGA screenmode, unknown to my A3000), the problem can be rectified by removing the offending tool type, thus forcing Type-Smith to clone the Workbench's screen-mode.

Font Formats

TypeSmith 2 is based

TypeSmith 2's toolbox is similar to that of other Soft-Logik programs. Drawing tools are topmost, followed by line tools, miscellaneous tools (including magnify) and the character access tools.
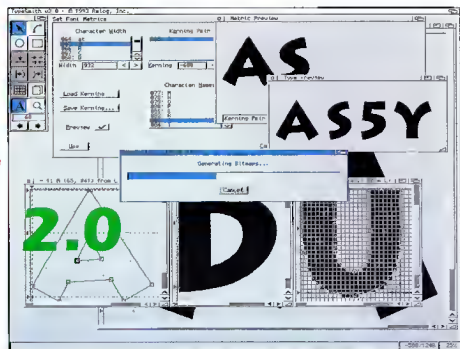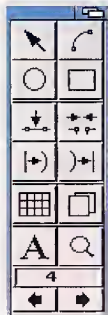
around the Soft-Logik Outline Font format, used widely by their PageStream desktop publisher. This format is used when loading or saving an outline font. All other formats supported by TypeSmith must be accessed through separate Import and Export submenus (for outline formats), or through the Template menu (for bitmap formats). TypeSmith 2 can load and save Compugraphic Intellifonts and PostScript Type 1 fonts, and export PostScript Type 3 fonts. The NimbusQ format used by Final Copy and Final Writer is not supported. TypeSmith 2's excellent manual provides a full rundown on font formats, including information on the differences between PC and Mac formats (and their support), and is well worth a read if you are unsure about such technologies.

Interface

TypeSmith 2 is completely OS-compliant, and uses the display database to allow selection of a screenmode in which to run. This is useful for owners of display cards, such as GVP's Spectrum or Village's Picasso II, which allow for much larger screen sizes. (Screen size is the only advantage, as TypeSmith does not run in any more than four colours.) Type-Smith 2's interface is similar to that of PageStream, with a small control panel which opens in a multitasking Amiga window. This control panel facilitates many of the most commonly performed drawing functions and line manipulations, as well as allowing access to any of a font's 256 ASCII character representations.

TypeSmith 2 uses a combination of straight lines and Bezier curves to represent its characters. The Pen tool is used for creating complex freehand shapes consisting of such lines. Additionally, the Box and Ellipse tools allow the quick creation of squares/rectangles and circles/ovals, respectively. The remaining tools allow manipulation of points and lines, and access to Type-Smith's magnification and bitmap editing functions.

A welcome addition to Type-Smith's control panel would have been the Undo tool, which unfortu-

nately is only available via menu (or hotkey).

Metrics

Spacing information is an important part of any outline font. TypeSmith includes an Auto-metric function which guesses the best spacing value for each character in a font based on user inputs for tracking, etc. Manual character width manipulation and individual pair kerning are easy, both complete with multitasking preview windows.

Bitmaps and Templates

To edit a bitmap font, you must first have an outline font open - selecting New/Outline from the Project menu is fine. You then enter a point size for your bitmap font, and Type-Smith 2 creates the bitmapped images based on the characters in your outline font (these will be empty if you have just created a new font). All pen and line tools are rendered useless while in bitmap edit mode. TypeSmith simply responds to clicks (and drags) within the supplied grid and turns pixels in the font on and off accordingly. Inclusion of bitmap support is welcome, if limited by the omission of simple tools. For those who require a bitmap font editor and are not interested in outline font support, several Public Domain editors, such as WBFed, are more than capable.

As mentioned earlier, TypeSmith 2 includes the capability to import bitmap templates and "autotrace" them, which creates an outline representation of the bitmap image - very useful for creating a series of base outlines which can then be worked on and touched up. The autotrace function works exceptionally well. I found it best left on its default settings, for trying to increase its accu-
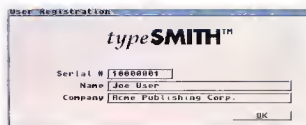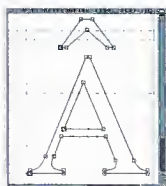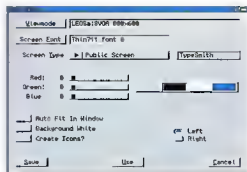
TypeSmith 2's options requester (above) and a composite character window (left).

racy simply resulted in a multitude of unnecessary points.

Impressions

TypeSmith is an exceptionally straightforward program to learn and use. Its system-friendly nature is definitely helpful here - no foreign gadgets or window layouts to confuse the issue. Unfortunately, TypeSmith 2 is not quite as stable as I remember its predecessor to be. It locked up frequently, especially when try-

ing to save its preferences, and once when it couldn't find the printer.

As desktop publishers, we at ADU have used the original Type-Smith extensively for font repair and conversion. Its ability to output .dat and .metric files for use with Professional Page was paramount, and it performed flawlessly in this regard. TypeSmith 2 also includes the abil-

ity to output these files, but all .dat files are now created complete with embedded pathnames, which necessitate a quick trip to a text editor to have these removed, before Professional Page's CreateFont program will touch them! A minor inconvenience, but annoying nonetheless. What's more, TypeSmith then reports that no if.fnt file exists in the target directory (and promptly hanged on several occasions). There was indeed an if.fnt file in said directory.

As stated in the reviewer's notes which accompanied our copy, TypeSmith is indeed the sole Amiga outline font editor on the market. In spite of this, the good news is that TypeSmith's features, interface and overall quality place it very close to being perfect for most applications. With full ARexx support, Hotlinks capabilities and extensive on-line
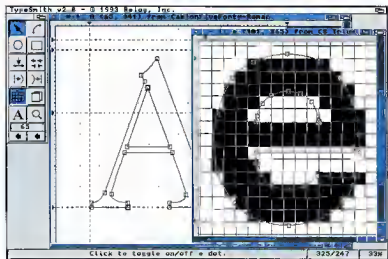
One of TypeSmith 2's new features, bitmap font editing, is shown on the "e" character above.

help rounding out the package, TypeSmith 2 is not to be missed. ■

Supplied for review by Soft-Logik

TYPESMITH 2.0

SPEED		
★★★★☆	OCS / 1.3	✗
FEATURES	ECS / 2.0	✓
★★★★☆	AGA / 3.0	✓
EASE OF USE		
★★★★☆		
MANUAL	**91%**	
VALUE		
★★★★★		

Where the Romantics left off...

...Amiga AGA takes up!

AMIGA
1200
4000

Commodore

Actual AGA Ham8 image displayed on A1200 or A4000

Object and Picture by Dean Ervik © 1993

1

2

Dean Ervik © 199?

WANG SHIH-WEI

3

1,2 These images, by Dean Ervik (Aus), are reprinted here from ADU 6 in their full glory. Unfortunately, the great gamma monster got the better of them the first time round. Sorry Dean, blame Pete...

3,4,7 From left, "Encounter", "CyberMan" and "Vibrations" (all 736x576) were created by Wang Shih-Wei (Aus) using Imagine 2.0 and OpalPaint on an 18 Mb A4000.

5 Matthew Buchanan (NZ) created this image (640x450) using ImageFX 1.5 on a 14 Mb A3000.

6 Amanda Cass (NZ) produced this image (320x256) with Imagine 2.0 and DPaint IV on a 6 Mb A1200.

8 "Tahkisis and Raistlin" (1280x512) took 80 hours to complete in DPaint IV on an A1200. Keith Smith (Aus) based the image on an oilpainted original by Clyde Caldwell.

9 Grant Preston created "Cutter and Leetah" on a 5 Mb A2000 with DPaint III.

We need your GFX!

If you'd like the rest of the world to see your masterpiece, send it to us on disk. We accept almost any format, and will return your disk(s) if you include an SSAE. Becoming famous couldn't be easier .. see pg 10 for address details.

5

6

4

WANG SHIH-WEI

SILICON CANVAS

8
Kirsh Smith '93

86000 L-YRS
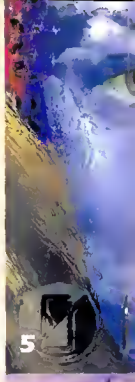
9
ElfQuest characters © Wendy Pini 1994

7

KUNG SHIH-WEI

*When it comes to computer-illustrated art, Paul Nicolai and Yvonne Westra prefer to let Amiga-generated results speak for themselves. They discuss with **Susan Buchanan**...*

THE AURA OF AMIGA

DUTCH-BORN DESIGNER/illustrator Paul Nicolai prefers not to tell clients how he achieves his stunning graphic effects. Although use of the Amiga has revolutionised his method of operation for the past eight years, publicising the fact means "swimming against the stream immensely, because most people will not accept anything which comes out of the Amiga," he says.

"Some are totally scandalised at the thought of producing quality work on an Amiga, which they perceive as basically a games machine. It's generally very hard to convince people with that particular attitude - even though the costs incurred on a Macintosh are seven, eight, nine times as much as mine, because a Mac is so much more expensive."

In initial discussions with clients, therefore, Paul and partner Yvonne Westra rarely mention the Amiga equipment which forms the technical backbone of their business - "sometimes we don't even mention the word computer, because it is irrelevant. It is the work that counts.

"If you show people a particular brochure and say you produce it inhouse, it is the design, the style, your ability as a designer that actually sells the product. The client is interested in the result, not how that result is achieved."

As is evident from the reactions of recent clients, Aim Direct, Curry Kitchen and Bean Supreme. None discussed the artistic process - the finished product was their prime concern.

When Paul established Aura Creative in

1986, computer-related work was the exception rather than the rule - 1-2 per cent, compared with 60-70 per cent today. And, although early experiments took place on an Apple II - "it cost me a fortune: $3500 in 1982" - the release of the Amiga ("immediately so much better graphically") opened up a whole new world. Subsequent rapid technological advances only confirmed his initial enthusiasm, and the wealth of Amiga options now available have resulted in "a much richer design environment in which to work."

Over the years, following hours, weeks, months of patient, often exhilarating experimentation, conventional design techniques were abandoned. The drawing board on which all work was previously meticulously carried out by hand has become a desk, complete with telephone. Magic markers of every conceivable hue - previously used for visuals - have been relegated to a drawer, where they have virtually dried out. Technical workhorses now are an A4000 networked to an A2500, enhanced by a Retina card, Emplant emulator, the bonus of TV Paint (see article page 20), SyQuest removable hard drive, and, of course, the invaluable modem and fax.

Essential to the success of this set-up, however, is the technical support and

expertise of highly-successful systems support company, PSI, the value of which cannot be measured when problems with hardware occur.

Says Paul: "Technology has caught up - or rather, my wallet has caught up with technology." The ability to invest in programs and hardware which allow his creativity full rein has paid dividends: he lists as major advantages programs like PageStream and ProPage; the use of a fast modem to communicate graphic files; the development of 24-bit painting; the Amiga's unique ability to emulate different platforms; plus the development of more and more service bureaus of a professional standard.

None of which, however, is any substitute for the blend of creative input from Paul and freelance designer/photographer, Yvonne. Their equipment is simply the tool which harnesses their boundless imaginations. Whether posters, packaging, brochures, questionnaires...their hallmark is originality. Textures, colours, presentation - the Nicolai-Westra combination turns a simple survey into a work of art.

Their professional paths diverged for several years - he towards computers, she pursuing black and white photography - until 12 months ago. Yvonne turned more to Paul's field while awaiting digital photography facilities, after plans for a conventional wet dark room fell through - fortuitously, as it happened. "I have become totally enthralled by the computer," she says. "I'm a late convert."

Their inspiration takes shape in the self-

Examples of Paul's work for (left) the Kiwi English Academy and (right) Elliott-Bateman's Curry Kitchen.

After his "visual" has been approved...

...Paul Nicolet creates the real thing.

contained studio/office of their private retreat, nestled in the Waitakere bush. The computer takeover has not so much cut the time, as re-allocated the emphasis of their work, but a major advantage lies in reduced costs to clients. Inhouse production cuts out once-conventional costs e.g., typesetting, although Paul and Yvonne draw upon a pool of specialists where necessary.

He now devotes more time to illustrations; she takes care of page layouts, in a networked operation where the illustration can be saved in the RAM drive, retrieved and loaded into Yvonne's DTP program, and printed out for evaluation, so much faster than before. On the other hand, points out Paul, the design process still takes the same amount of time.

"What the computer does is give you options, through the fact that you can change things quickly. For instance, you can look at more colour options, or typefaces, and make instantaneous changes. You can pick combinations that maybe, conventionally, you wouldn't have come up with, because it would have taken too much time. As a designer working within tight deadlines, you tend to

These images appeared as article illustrations in Auckland's Metro magazine.

rely on what you know will work, and that is also one of the dangers - the more you rely on what you know, the more conventionally and routinely you start to work.

"The design world is continuously changing - new options, new styles, new colours. With a computer, it's easy to become more innovative. You can quickly see how an effect would work in a particular new style, and by experimenting, you familiarise yourself with that style. Even when you don't consciously adopt it, it becomes part of your work process."

Success did not come overnight. Before the advent of 24-bit painting, Paul admits that every picture tended to have a computer-related look. But, depending on the style used, "you could get away with it, because it was still a picture in its own right." One receptive client, a Metro magazine art director, has used Paul's work to illustrate articles ranging from violence, to rugby, to prostate cancer.

Says Paul: "The article would be on a theme, but you could approach the illustrations in different ways. So I would do several different illustrations, with ten colour variations for each file, then put my camera in front of the screen, photograph the image as a transparency, have it developed, pick it up two hours later and take 55 choices to Metro to show him. He had never seen anything like it."

After the desired shots had been selected, Paul would return home, output the pictures as a targa file and have them put through an image recorder, to end up

with a transparency which could be used immediately.

Even that process has now been superseded - and Paul barely needs to move from the comfort of the studio to fulfil the client's instructions. His business is the culmination of a dream, originally sparked in Holland, where he grew up in a tiny northern village, close to the Alkmaar cheese market. His creative bent was encouraged by both his mother and his grandfather, and, while still at school, he worked part-time in an advertising agency, cleaning paint pots. After compulsory military training (in the Navy, where he "made a fortune drawing naked ladies for the guys!"), he headed for Amsterdam at a time when the city was alive with change - 'students, hippies,

Matthew Grove presents a tutorial on the popular Public Domain raytracer reviewed in ADU 4.

Persistence of Vision

AFTER MY ARTICLE on Persistence of Vision (POV) in ADU 4, readers expressed an interest in this program, and since then, version 2.0 has been released. In this tutorial I will introduce some of the powerful features added to the new version, plus some of the original features.

Declarations

One important feature of POV has been the ability to use identifiers in declaring objects. The new version provides even more scope for declaring items and assigning them names. It is possible to declare constants and vectors, and use these in expressions. If you want to place a sphere one unit above a table, you might have something like:

```
Example 1

#declare Table_Height = 10
#declare Sp_Height = Table_Height+1
#declare Sp_Radius = 2

. . .

sphere { <0, Sp_Height, 0>, Sp_Radius }
```

Numbers and vectors can be replaced almost anywhere by declared identifiers and expressions. Even a declaration such as #declare Position = Size * <1,3,2> - 1 is possible. When a vector is multiplied by a number, it scales the vector, and addition or subtraction translates the vector. (Note also that multiplication, division, addition and subtraction of vectors is calculated on a term-by-term basis eg. <1,2,3>*<2,2,2> = <2,4,6>). Declarations should be used as much as possible, especially when certain numbers or expressions are used several times in the scene file. That way, the scene can be altered simply by changing the declaration, and not searching for every occurrence in the scene file. It also means that the computer gets to do all the arithmetic, which is really what it is there for!

It is also possible to declare colours, textures, light sources, objects and parts of objects, such as a union or intersection of shapes. If you wanted to create a plant, you could need leaves, and may do something like Example 2 (which actually forms a simple leaf shape).

You might create branches and flowers, and finally construct a plant. Before attempting to create such complex objects, however, let's examine some basic features...
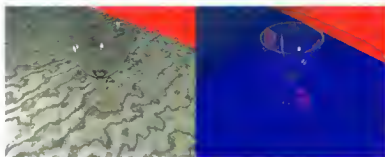
The choice of texture makes a great difference to the final output...
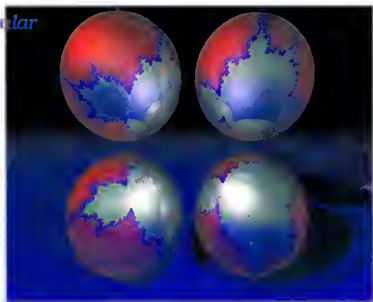
Textures

The texture settings in the new version have been split into three separate parts, each affecting some property of an object's appearance. The most obvious is the colour, or pigment, of an object. Then come the normal (or perpendicular) properties of the object, which define its surface, and lastly, the finish of the object specifies how light reflects and highlights it.

```
Example 2

#declare Leaf =
intersection {
    sphere { <0,0,0>, 1
        scale <1,2,1> }
    sphere { <0,0,0>, 0.98
        scale <1,2,1> inverse }
    plane { x, 0.75 inverse }
    sphere { <1,0,-3.77>, 4 }
    sphere { <1,0,3.77>, 4 }
    translate <-0.75, 1.32,0>
    rotate <90, 0, 90>
    bounded_by {
        sphere { <0, 0, 1.32>, 1.33 }
    }
}
```

Pigment

For the pigment, you can either go for a simple monochrome, e.g., colour red, or use one of the built-in textures such as marble or agate, and apply your own colour map. Note that the textures define just the pattern, not the colours, which you specify using a colour map. In other words, there are as many differently-coloured versions of marble as you care to create, but all with the same pattern. When POV calculates textures, it generates a number between zero and one for each point on the object. The colour map specifies what colour to use for these values, by giving a list of values and the colour at each. POV automatically creates a smooth transition between the colours. For example, a colour map that goes from red to blue to green, using an agate pattern, could be defined as:

```
Example 3

texture {
    pigment {
        agate
        colour_map
        {
            [0.0 colour Red]
            [0.5 colour Blue]
            [1.0 colour Green]
        }
    }
}
```

Normal

The normal section is used to create effects such as bumps or waves on a surface, by simulating how light reflects from such surfaces. It

doesn't actually create a bumpy surface, but merely makes the surface appear bumpy. This is like painting bumps on an object - there aren't any bumps in reality, just the illusion through the artwork. The simplest normal effect is bumps, which creates the effect of bumps on the object's surface. The bumps keyword takes a parameter between zero and one, which indicates the apparent depth of the bumps. If the normal is scaled, the depth of the bumps is not affected, but size and frequency change. Since the bumps tend to be about one unit in size, you may want to scale them to suit the size of the object. For example, a small sphere may need them to be scaled down.

Finish

Finally, the finish settings allow various properties of light reflection to he altered and added. Phong highlights - bright, shiny spots caused by the reflection of light sources that are the same colour as the light source - along with specular highlights that more closely model the reflection of light, can be added to objects. Both the phong and specular keywords take a parameter between zero and one that indicates how much highlighting to add. For phong highlighting, there is a phong_size value that

Example 4

```
sphere
{
    <0,0,0>, 1
    pigment {
        colour Gold
    }
    normal {
        bumps 0.5
        scale 0.1
    }
}
```
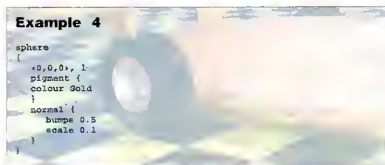
allows you to set the size of the highlight. Large values create a small, shiny highlight and smaller values create a larger, duller highlight. For specular highlighting, a roughness value also allows for shiny, through to dull, highlights. Very small roughness values of around 0.001 create a very smooth appearance.

It is also possible to create a reflective finish, which will reflect other objects in the scene. The reflective keyword takes, as a parameter, the fraction of the light reflected. A value of 0.5 would mean that half the

Soft shadows are a real test of raytracing power.

colouring of the object would come from reflected light. Two other important controls are the ambient and diffuse keywords, which allow you to control the amount of background and direct light reflected from an object respectively. Ambient light is that which does not come directly from a light source, but is reflected off other objects. While POV cannot calculate this directly, the ambient value allows an object to be lit by a certain amount of "default", white light. Low ambient values are best - otherwise any shading (which is what raytracers are good

at) would disappear. The opposite, diffuse light, is that which comes directly from a light source. This should be high, or else there will be no shading! You may get some interesting results if you set the ambient light to zero, but usually this should be around 0.2. The diffuse value should be set around 0.8. (I try to make sure that the ambient and diffuse values add up to one, but this is not a hard and fast rule).

Syntax

As you may have noticed in Example 4, there is no texture { } structure around the pigment and normal structures. POV is now much more flexible about the syntax and it is up to you whether you bother to put this in, as in Example 3.

Spotlights

Apart from setting up a scene, the next most important thing is the lighting. Along with normal point-light sources, POV provides a spotlight option for light sources that restricts a light source to a cone of light. The spotlight also allows the light intensity to decrease at the edges of the cone. Spotlights consist of two cones, an inner, fully-lit one, and an outer one where the light fades to nothing, producing a soft edge. The size of these cones is specified by half the

Example 5

```
light_source
{
    <0,20,0>
    colour White
    spotlight
    point_at <0,0,0>
    tightness 50
    radius 60/2
    falloff 90/2
}
```

angle of the cones at the light source. For example, if you wanted an inner cone of size 60 degrees, fading to zero light at 90 degrees, you could do as in Example 5 (above).

The point_at vector indicates what the spotlight should be shining at, and the tightness value indicates how rapidly the light fades at the edges. Smaller values produce softer edges. Spotlights are great for highlighting objects in a scene, or for just providing a more interesting lighting effect.

Soft Shadows

Because raytracers project "perfect" rays of light into scenes, the shadows left by objects are very sharp. To soften the shadows, POV provides "area lights" - essentially panels of light sources. This means that instead of having just one point-light source, you might have a 5x5 panel of light sources, each 1/25 as bright as a single source. The orientation and size of the panel is specified by two vectors in the plane of the panel. For example, a 5x5 panel centred 10 units above the origin over a 2x2 area, lying in the x-z plane:

Example 6

```
light_source
{
    <0, 10, 0>
    colour White
    area_light <2, 0, 0>, <0, 0, 2>, 5, 5
}
```

The latest word processor from the stable of Pen Pal and Final Copy II, confirms the move towards a more DTP-style environment. **Dudley Storey III** *takes it for a test drive.*

Final Writer

SoftWood ■ NZ$295 ■ A$219

OUR ROUND-UP of word processors last issue missed the release of Final Writer, just as we were going to press. A new program from the producers of Final Copy II, it promised to upset the final standings. How, in fact, does it rate?

In looks and general operation, Final Writer incorporates the best features of its predecessor, Final Copy II. In fact, the resemblance is so close, you could call it "Son of Final Copy". In my review, I referred to Final Copy II as more like a desktop publisher, without all the complex commands you'll never use - call it a "word publisher". Final Writer takes this concept a step further. Because of the program's similarities, this

review will concentrate on the major differences and corrections between Final Writer and Final Copy II, rather than those functions which remain the same.

Firstly, Final Writer has caught up with the multitude of features that set Wordworth ahead of Final Copy II. In addition to crafting an outline, you can now place a bibliography, tables of contents and illustrations, endnotes and an index within a document. The fact that Final Writer defaults to embedding these, all graphics and most preferences with the document text, produces very large files. Which is

not really a problem, since you have to use a hard drive - Final Writer's eight installation disks won't run the program alone. The smallest configuration of the program will eat up 2 1/2 Mb on your hard disk, the largest just over 9 Mb.

Final Writer improves markedly on Final Copy's already-excellent handling of graphics. As before, you can add simple graphic forms (boxes, circles, arrows, lines, etc.) and load IFF pictures, even 24-bit images. Blocks of text can also be treated as graphic objects, moved, scaled, rotated and saved independent of the page - perfect for the type of impressive titles that would previously have required work in a desktop publisher, before being printed. However, graphic elements not created within the program itself, such as EPS clip art (Final Writer comes with a large set of commercial EPS images) and IFF pictures, cannot be manipulated with this

Final Writer is more than a word processor - it's a word publisher.

freedom - an area that should be addressed in Final Writer II. All elements can be locked, grouped, sent-to-back, and displayed as quick previews - more features traditionally reserved for DTP.

The Button Strip

The menu and a major new feature, a row of short-cut icons positioned at the top of the screen, are now fully configurable from the Preferences editor, along with many other variables. As an example, you could define a text style for any of Final Writer's four classes of fonts: standard Amiga and three outline: Type 1, Compugraphic and NimbusQ (Final Writer contains 120 typefaces of the latter in its font directories), for size, leading, width, colour, case and oblique percentage. Give this action a keyboard shortcut from the function keys, then add an entry in the main menu and icon row for easy access. Or do the same for a text clip - a small piece of text, saved with its own preferences, (information used often, e.g., an address) - to call it up and paste it in your document. I've saved the new game and program score templates as a text clip that I can load into every review at the push of a button. In other words, you can edit the word processor to suit your working style.

Improvements

Small failings apparent in Final Copy II have been corrected. As an option, the spelling checker now automatically suggests alternatives when it finds a misspelled word; it also remembers words you have added to the user dictionary, and will suggest these as alternatives if applicable. An auto-save feature has been implemented. Printing options have been expanded. ARexx and PostScript support have been improved, especially that for PostScript (options for crop marks, halftoning and page scaling have now been included). Coverage of both topics in the manual is also improved; the text is factual and precise, but, unfortunately, dull. On the down side, the program has inherited the drawback of Final Copy II's slow printing times. Anything with graphics or PostScript text takes far too long. Printing otherwise is good, crisp and clean.

Final Writer

Word Processor for the Amiga

Final Writer by SoftWood Inc.

One feature I did not mention in my summary of Final Copy II in the last issue is the page slider gadget. The scroller controls on the right and below the text window are "real-time sliders," by which I mean that moving them moves the page at the same time - in most other WP programs, you move the slider, release it, let the page display update to find out where you are, move it again, and so on. After some experimentation, I found I preferred the former. The page updates its display quickly, (16 colours included), allowing you to find a position fairly fast, even within a long document. Dividing a large document with the Final Writer feature, "sections", also

Continued from page 33

helps in this regard. Sections are different areas of a document, edited separately for purposes of clarity, such as the title page, preface, bibliography, and other special areas, with as many individually-named sections as you wish within the main body of the text. "Master pages" are templates to control the "look" of each left or right page. A decorative border designed on a master page will appear on every page (with the exception of the title).

Final Writer's auto-save function is the only thing that will spare you from a serious accident, since the program inherits Final Copy's major blunder - the lack of an undo function. Perhaps SoftWood believe Final Writer is such a perfect piece of software that mistakes could never be made. In my opinion, it *would* be the perfect word processor, if it had an undo! For this reason, Final Writer is awarded 89% overall - if the team at Soft-Wood had put in that one percent of extra effort to create an undo, the program would easily have received an ADU-Approved stamp. As it is, Final Writer still rises to the top of the word processor round-up. Despite its few faults, it meets and exceeds the standards of professionalism set by Digita's Wordworth v2.

Final Writer does well when compared to the word processors reviewed in ADU 6. It

will import WordPerfect, Pen Pal, ProWrite and ASCII files, save in Final Writer and ASCII formats, import IFF and EPS graphics files, and comes with a 144,000-word dictionary, and a thesaurus containing 1.4 million cross-references. Final Writer requires 1.5 Mh to run, and apart from not being able to speak your document, is capable of every feature listed in ADU 6's comparison table.

Overall, I could not wish for much more from a word processor. However, as well as an UNDO, faster printing speed and more graphics controls, I'd like to see Final Writer II contain a grammar checker (a utility to advise the correctness of sentence structure), footnotes rather than endnotes, and better control over headers and footers. ∎

Supplied for review by TUPsoft

that each pixel on the screen was also given a level of transparency, corresponding to a tone between black and white, (where white meant that no background showed through i.e., zero transparency, while full black meant that the pixel revealed the full brightness of the pixel behind it i.e., fully transparent), each pixel would now be represented by its colour value, plus its transparency value i.e., 24+8=32 bits. This extra 8-bit value, referred to as an "Alpha channel", is stored for each dot on the screen. In DTP, this transparency allows images to be layered (or composited) more realistically. In video, the effect is more vivid, especially if the pixel's transparency is altered over time. Text and graphics can be smoothly faded in and out over video backgrounds; ghosts look real enough to haunt our imaginations; and, far more importantly, true antialiasing of text and graphics over live video backgrounds occurs.

RS-232, RS-422, Control L/S

These terms refer to the type of serial port used as a controlling connection between a video device (e.g., VCR) and a controlling device (e.g., computer). Most computers have one of the first two, as do the majority of newly-released, professional VCRs or VDPs. Control L/S ports are used mainly on domestic VCRs.

Colour Zero

One of the benefits of owning an Amiga is the ability to utilise colour 0 as a transparent colour. This used to be black only, until the

release of the ECS and AGA chipsets, where any one of the available palette colours can be transparent. This ability comes via the Denise/Lisa chip, so video boards e.g., OpalVision, must have hardware onboard to create their own transparent colour(s).

Illegal Colours

Computers have no problem producing very strongly-saturated colours, which colour RGB monitors are designed to handle. Unfortunately, when such colours are encoded into a composite signal for transference to video tape, a marked degradation in colour saturation and colour sharpness occurs. By using a cabling system superior to composite, a definite increase in the quality of image colour would be immediately evident. To avoid this occurrence as far as possible, it is recommended that colours used lie within the "legal" range, i.e., with a saturation of no more than approximately 70% of full value. This is where an HSV (Hue, Saturation and Value) set of adjustments comes in handy, and all programs for general videographic production should have one. Some image-conversion programs e.g., ADPro, ImageFX etc., have a utility to reduce colour saturation within these legal limits. However, their American origin, intended for the NTSC system, usually reduces such saturation further than is necessary for PAL.

In my next article, continuing the "back-to-basics" approach, I'll demonstrate the basic requirements in hardware for a ready-to-go system. Catch you then! ∎

It is also possible to turn an area light into a spotlight. This can really speed up raytracing, if you want just one part of the scene lit by the area light, because the raytracer only has to do calculations for the part of the scene inside the spotlight cone. Note, however, that these area lights are flat, and any shadow cast in the plane of the panel will still be sharp. It would therefore not be a good idea to place an area light at the centre of a scene. Remember that every ray that POV sends into the scene, which hits an object, has to be tested against every light source, so every light source added to a scene can significantly increase the raytracing time.

Merge

Another powerful option included in the new version is merge. When creating transparent objects consisting of several objects intersected and combined, there are still internal edges as far as the raytracer is concerned. If you take a transparent sphere and centre it at the corner of a

Example 7

```
merge {
    box { <-1, -1, -1> <1, 1, 1> }
    sphere { <1, 1, 1>, 1 }
    texture {
        Glass
    }
}
```

transparent cube, a ray entering the sphere could still collide with the corner of the cube, even though it is "inside" the object. The merge option - provided to eliminate this effect - is used in exactly the same way as the union constructor.

Height Fields

Most of the objects provided by POV are pretty basic, and, while it is possible to construct most elementary objects from a collection of spheres, boxes and cylinders, trying to create that really impressive picture often requires something more. To make things interesting, POV provides us with height fields, which use images to create raised sur-

faces ranging from smooth, undulating hills to sharp, jagged peaks. POV takes an image, and assigns a height to each pixel of the image, depending on the colour or palette number of that pixel. Three image formats are supported: GIF, TGA and POT, none of which, unfortunately, is common on the Amiga. However, POV outputs TGA files, which we can use, but to do so, you must understand how POV uses the TGA format for height fields. To calculate the height of a pixel, it uses the red value for the most significant byte, and the blue value for the least significant. What this means is that if you create a scene which contains only reds (just use red light sources), the resulting TGA image can be used as a height field image in another scene. When used, the brighter pixels form the higher sections of the landscape, and a look at the example picture below may show that I used a marble texture to create my height field.

Tips

When first raytracing a new scene, use the -q (quality) option and a low quality, and render small (say 80x64) images first, to check that at least something in the scene is visible. Don't add time-hungry extras, such as reflection, until you are sure that everything in the scene is just right.

That concludes this tutorial, which, hopefully, will inspire you to create some awesome images in the near future!

Persistence of Vision 2.0 is available from FTP sites, and BBSs such as NZCUG and Amiga Auckland!   ■
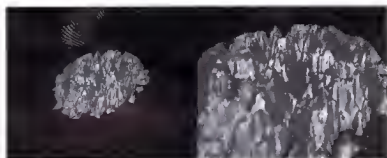
A height field (and close-up) created from the marble texture.

*Our resident "master" of C and Assembler, **Peter Morrison**, picks up some pointers from these two volumes from Bruce Smith Books.*

Mastering Amiga C
Mastering Amiga Assembler

THERE IS A steep learning curve involved in acquiring new computer languages. Particularly, it seems, in the popular C language. A further steep learning curve is involved in becoming familiar with the Amiga operating system. Put the two together, and the problems for the novice become almost insurmountable.

Enter Paul Overaa

Analytical chemist and writer for Bruce Smith Books, Paul Overaa is well qualified to write these two books to assist the novice

to Amiga proficiency. He spent two decades working in the field of gas-liquid chromatography, during which time he became interested in computing and computer programming. Published topics include 6502 and Z80 assembly programming, Amiga System Programming, and Amiga Program Design, in addition to the Mastering Amiga C and Mastering Amiga Assembler duo.

The first books about programming I ever read likened variables to pigeon-holes, and values to little pieces of paper that you could "store" in those pigeon-hole variables. Needless to say, I have come a long way

since then. Both Mastering Amiga C and Mastering Amiga Assembler assume that the reader has a full complement of pigeons, and there is no mention of such simple concepts.

Counting Pigeons

Instead, the books launch into a discussion of what basic variable types exist in both languages, and introduce the concept of pointers. With these fundamentals in hand, the stage is set for a full-on review of the two languages, and how they apply to the Amiga.

Mastering Amiga C
Bruce Smith Books ■ NZ$90 ■ A$65

As stated in the smaller (320 pages) of the two titles, a large part of the Amiga operating system was written in C; thus this language is particularly well-integrated with the Amiga operating system calls and environment. The

basic premise behind the Amiga OS is the idea of "libraries" of functions for a particular purpose. The "intuition.library", for example, holds all the functions that make up the part of the Amiga OS known as "Intuition". At a lower level, the Intuition part of the system calls upon the libraries known as "graphics.library" and "exec.library", for handling basic (and more complex) graphics, and to arbitrate resources and handle message-passing.

With this complicated system of inter-library dependence in operation, even before the budding programmer gets a look in, things can

seem difficult at best. Fortunately, Mastering Amiga C (which has an unfortunate acronym) passes lightly over these deep waters, and lets the Amiga OS do the job for which it was designed - that is, keeping out of the way as much as possible, and allowing the programmer to work in a virtual "single-task" environment.

Chapters in the book skip back and forth from basic C to the Amiga OS. It seems haphazardly designed to the casual eye, but reading the book from cover to cover reveals that the more advanced elements of the C language are saved for when they are required, to understand the more advanced elements of the Amiga operating system.

Early on, a chapter on programming fundamentals (repeated almost verbatim in Mastering Amiga Assembler) takes an abstract look at the methods of designing large programs - in particular, the Warnier diagram method, a language-independent program design technique. Its placement in the book, I thought, could have been more carefully determined. After giving the briefest taste of what the Amiga OS

can do for you, the author takes a giant leap back to look at the abstracts of creating large programs. I would be more inclined to pay attention to such a chapter if it were at the end of the book, when I would be ready to create a large program, and such guidance would be welcomed, rather than skipped over.

Much of the latter part of Mastering

Amiga C is taken up with the glossary, bibliography, appendices, and index. It almost seems as if there are more of these than actual book! The appendices run from A to H, covering three major C compilers, bits and bytes, ASCII, ANSI, and some useful tools for C programmers.

Accuracy

One of the most important things to get right when printing a book on programming aimed at beginners is the program text itself. While typos in the main text can be overlooked (and there are a few), the program text must be absolutely letter-perfect. In this respect, Mastering Amiga C comes through quite well. Not without error, mind you, but the few I spotted were more logic errors, than typos, and the programs containing them could probably have been compiled and run, without crashing the Amiga they were run on. Nevertheless, programs that don't work when they have been laboriously typed in, cause enormous frustration for novices learning to program from a book.

Summary

Although I am not a novice in either C, Assembler, or the Amiga, I found these books informative and interesting. It was not so long ago that I looked upon a screenful of C and said "what's that?", and I can remem-

ber the time when I forced myself to read the RKMs - all 1400 pages of them. Books like these would have made things almost too easy. I look forward to a new generation of Amiga programmers, taking guidance from the pages of the Mastering The Amiga series, and creating quality programs.

Primarily because the layout could be somewhat improved, both in terms of organisation, and also by including more in the way of screenshots, pictures, and liveliness, Mastering Amiga C and Mastering Amiga Assembler, miss out on an ADU-Approved stamp. ■

Mastering Amiga Assembler

Bruce Smith Books ■ NZ$90 ■ A$85

The main purpose of this hefty, 416-page tome is to introduce beginners to the basics of the 68000 assembly language, as presented by

the HiSoft Devpac 3 assembler environment. The secondary purpose is to integrate this new knowledge with the low-level aspects of the Amiga operating system. This is a valiant

attempt, but even the author knows that, without an extra 800 pages of closely-spaced, small type, the quest for knowledge has barely begun. However, the programming sections cover a wide variety of Amiga library calls, from the simplest "Hello World", (actually "this is just my line of test text"), to a pair of message-passing programs that recognise the existence of each other in the multitasking context of the Amiga.

Amiga programming concepts are introduced only after the required lengthy introduction to the 68000 processor, and discussion of the registers and instructions available to programmers using that particular chip. This lasts for the first six chapters, and by the time you reach the Amiga introductory text, the mysteries of assembler programming are definitely less challenging. Amiga system programming dominates the remainder of the book, and the learning of assembler takes a back seat to the vagaries of Exec, Intuition, and various other system libraries.

The recommended-reading list at the end of the book lists first the Addison Wesley technical series of Amiga ROM Kernel Manuals, mentioned throughout the book's text. Without access to these bibles of Amiga technical information, any beginner will be stuck. No other book (except, maybe, Mapping the Amiga) can begin to reproduce all the information stored in the ROM Kernel Manuals.

Without the RKMs, Mastering Amiga

Assembler introduces the concept of system structures, and datatypes, in a straightforward fashion. Choosing rather to put building blocks in place, than to present every system structure for inspection, Paul Overaa primarily uses Intuition's Windows, Menus, and IDCMP structures as an example. Having read this book, the novice can feel confident that the RKMs will no longer look like page after page of Martian!

Appendices

Mastering Amiga Assembler finishes with "The C Language" (a remarkably condensed version of Mastering Amiga C - the C part, at least), tables of all the library functions used in the book, an overview of the PD A68K assembler, and the bibliography.

In the not-very-extensive list of Amiga programming guides for the beginner, Mastering Amiga Assembler must rank highly.

MASTERING AMIGA ASSEMBLER

READABILITY ★★★★★
ACCURACY ★★★☆☆
LAYOUT ★★☆☆☆
VALUE ★★★☆☆

83%

AMAZING FX

The Roll Scroller

by Ray Abram

HAVE YOU EVER seen and envied the effect in Amiga demos, where pictures appear to roll on to the screen, with the background in darker shades of the rolling picture, and upside down? The result - the illusion of viewing the back of the picture as it rolls up the screen.

If this sounds too complex or too tough to program, think again. Amos is quite capable of achieving this effect, and furthermore, with a little help from Amal - Amos's animation language - the effect can be made silky-smooth and free of the slightest jerk (no pun intended !).

Requirements

This effect requires a lo-res picture with a maximum of eight colours, and assumes your ability to type in this program bug-free. A word of warning, however: ensure that the Amal programs are typed in letter for letter, in the same case (upper or lower), in which they appear in the listing.

How am I able to roll the picture up the screen, and see the back (darker version) of the picture behind the rolling image? The answer lies in the special Amiga dual-playfield display mode, in which two pictures can be displayed and viewed on top of each other. The rear picture can be seen wherever colour 0 appears on the front screen. The top picture, therefore, is like a piece of cellophane on top of the bottom screen, allowing only areas of pen 0 to shine through.

Use of dual playfield places certain limitations on the type of picture that can be used, particularly its restriction of only up to eight colours in lo-res (see your manual for the rest). Ensure, therefore, that your choice for use with this demo has no more than eight colours. To make the most of the effect, your picture should also feature enough colour 0 areas to allow the rear image to shine through.

How It Is Done

Now that you understand how the effect appears, I will show you how to achieve the illusion of the picture rolling up the screen. If you look closely at the following diagram, the "Rolled On" image is the correct way up, but the "Waiting To Roll On" image is upside down. So, as the front part scrolls up one scan

line (a line of the picture on your monitor), the back part needs to scroll up two scan lines (one scan line appears on the front picture, and the second scrolls up to make the back picture appear to move up the screen, and prepare to be copied to the front picture).

The flow of the effect is, therefore:

Front Screen
Rolled on
on roll to waiting
Back Screen
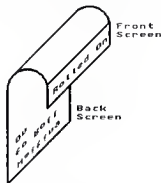
♦ Copy the back scan line to the front screen.
♦ Move the back picture up two scan lines.
♦ Repeat until the picture is all scrolled up.

The dual playfield screenmode thus takes care of showing the two screens through each other.

Note that if we use Screen Copy to copy the scan line from the back screen to the front screen, and then Scroll to scroll the back screen up two scan lines, the result would be very slow and jerky. Use of Amal's Screen Offset, Size and Display channels produces the above program flow, with the result that no part of any picture is copied or scrolled around in memory. Only the sections being viewed are adjusted. Thus the effect is fast and smooth.

Reality

We will now translate the theory into reality. At Reference 1, I create variables to hold the screen numbers that I will be using, in order to make the program more readable and easier to follow.

The picture that you would like my program to use is then loaded in at Reference 2.

Halfbrite

Once the picture has loaded, we need to find the halfbrite colours for the back screen to use. But first, you must understand how a colour value on the Amiga is made up. As the

Amiga (ECS chipset) has a total of 4096 colours that the user can assign to a pen on the screen, we need an easy way of telling the computer which colour we want. The bright people who invented the Amiga came up with the idea of the number in question having three components - red, green and blue. Therefore, to get a colour on the Amiga, we must tell the Amiga how much of each component we want to be in our colour. (A value between 0 -› 15 ie: 16 * 16 * 16 = 4096 =› WHITE). To achieve the halfbrite shade of a colour from the picture, we must isolate each RGB component, halve it and then put it back into the colour. See Reference 3.

The result is a new colour, half the brightness of the original, which is then placed into a palette entry from 8 to 15. That position is dictated by the fact that the back screen of a dual playfield screen in Amos gets its colours from the colours 8 -› 15 of the front screen.

Now we need to set up the back screen for the trick. At Reference 4, the back screen is opened. It must be twice as high as the front screen, because, as the back screen scrolls up, we need to have a blank area at the bottom to create the illusion of the Roll Scroller.

As mentioned earlier, the back screen needs to be flipped (at Reference 5), to give the illusion of the back picture rolling up.

At Reference 6, the default starting positions for the screens are set up, as follows:
♦ Top of front screen at bottom of view area.
♦ Front screen's height = 1 (0 makes strange things happen!)
♦ Front screen's data offset set to bottom of picture.
♦ Top of back screen at bottom of view area.
♦ Back screen's height = 1 (0 makes strange things happen!)
♦ Back screen's data offset set to top of picture.

We have now reached the most important command in the trick - the dual playfield command. At Reference 7, this command is executed. Note the positions of the two variables, since the colour palette for both dual playfield screens comes from the first parameter to the command. This command is placed inside an If ... Then ... statement, so that it is only executed the first time that the If - Then is executed. This loop can therefore be executed many times, without the worry of trying to make two screens into dual playfield more than once.

The Trick

Now for the trick itself. At Reference 8, Amal does its bit, superseding the slow Screen Copy and Scroll technique, with the following super-fast, super-smooth method:

- Move the position of the front screen up one scan line.
- Increase the height of the front screen by one.
- Move the data viewing offset of the screen up one scan line.
- Move the position of the back screen up one scan line.
- Increase the height of the back screen by one.
- Move the data viewing offset of the screen up two scan lines.

Thus the illusion is there, but no data is copied around the memory. What the user views is just cleverly changed to produce that illusion.

UnRem the line following Reference 9, to switch the back screen to the front of the display, and allow you to see clearly how the effect works.

The final necessity is a way for the user to control this effect simply and easily. At Reference 10, I have written a mouse key routine, where hitting the left mouse button repeats the routine, and hitting the right mouse button ends the program.

Time-lapse photography (!) shows how the picture scrolls on to the screen.

Strange Problems With This Routine

This one has me beat. It seems that some Amiga 500s spit out the error "Can't Set Dual Playfield", when the user tries to run the line after Reference 7. The solution was supplied by a f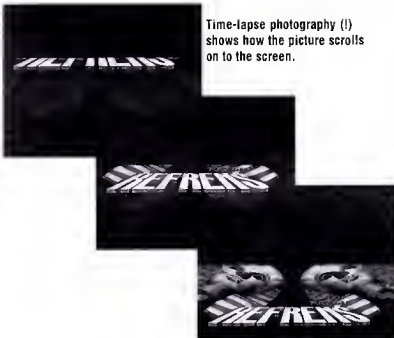riend (Criss), as his Amiga 500 exhibits this strange problem. He opened three screens - two of the size required for this demo, and the third containing the picture for the demo. The dual playfield screenmode was set on the first two screens and the demo picture then copied from screen three to the two screens used in this demo. I have not struck this problem on a few Amiga 500s, (which, from the documentation supplied with them, suggests that they are the same as mine [Yes, I use an A500]), and don't have a clue as to the cause.

Possible Modifications

Dual playfield can be used for several other cunning tricks, including simulation of a spotlight moving around on top of a screen. Around the spotlight, the back screen is visible, and away from the spotlight is blackness. A black screen is placed over the top of the picture you are using, and a bob made from pen 0 moved around on it, the result being that wherever the bob is, the back screen of the dual playfield screen shines through.

Subscribers to Amiga Down Under can find a working version of this issue's Roll Scroller ready to go on the subscriber disk, and the program described under Possible Modifications.

If you have any ideas for future articles that you would like me to investigate, or are just having problems with Amos, drop me a line C/- Amiga Down Under and I'll see what I can do. ∎

```
Rem ==========================================
Rem =                                        =
Rem =            Roll Scroller                =
Rem =                                        =
Rem =         By Ray Abram                    =
Rem =                                        =
Rem =                          (C)1994 =
Rem ==========================================

Rem Keep a track of screens
Rem ** Reference 1
FRONT_SCREEN=0
BACK_SCREEN=1

Rem Turn off the mouse
Hide

Rem Get a picture
Rem ** Reference 2
Load Iff "Picture.Iff",FRONT_SCREEN
Screen Hide FRONT_SCREEN

Rem Make a halfbright colour of 0 to 7 into colours 8 to 15
Rem ** Reference 3
For CL=8 To 15
   CMASK=$F00
   CMUL=$100
   CTEMP=Colour(CL-8)
   CLALL=0
   For MSK=1 To 3
      CADD=CTEMP and CMASK : Rem Isolate an RGB value
      CADD=CADD/CMUL : Rem Make to a number 0 to $f
      CADD=CADD/2 : Rem Find half the colour value
      CADD=CADD*CMUL : Rem Move the number back to RGB position
      Add CLALL,CADD : Rem Store to new cumulative RGB colour
      Ror.l 4,CMASK : Rem Get mask ready to keep next component
      Ror.l 4,CMUL : Rem Set up multiplier for next component
   Next
   Colour CL,CLALL : Rem Use half bright colour register
Next

Rem Open a second screen
Rem ** Reference 4
SCW=Screen Width(FRONT_SCREEN)
SCH=Screen Height(FRONT_SCREEN)
S_BOT=SCH+49 : Rem Start of screens on bottom of the view
Screen Open BACK_SCREEN,SCW,SCW+2,Screen Colour,Lowres
Rem Some blank area on bottom
Screen Hide BACK_SCREEN
Curs Off
Flash Off
Paper 0
Get Palette(FRONT_SCREEN)
Cls

Rem flip the picture upside-down to bottom of BACK_SCREEN
Rem ** Reference 5
SC_ST=SCH
For CPY=1 To SCH
   Screen Copy FRONT_SCREEN,0,CPY,SCW,CPY+1 To BACK_SCREEN,0,SC_ST
   Dec SC_ST
Next

Rem Show the screens
Screen Show FRONT_SCREEN
Screen Show BACK_SCREEN

FIRST=True
Do
   Rem ** Reference 6

   Screen Display FRONT_SCREEN,,S_BOT,,1
   Screen Display BACK_SCREEN,,S_BOT,,1
   Screen Offset FRONT_SCREEN,,SCH-1
   Screen Offset BACK_SCREEN,,SCH-1
   Wait 5 : Rem Very important command !!

   Rem Dual playerfield front and back screen
   Rem ** Reference 7
   If FIRST Then Dual Playfield FRONT_SCREEN,BACK_SCREEN
   If FIRST Then FIRST=False

   Rem The hardware scrolly part
   Rem ** Reference 8
   AML1$="Start: Let Y=Y-1; Pause; If Y>50 then Jump Start;"
   AML2$="Start: Let Y=Y+1; Pause; If Y>80 then Jump Start;"
   AML3$="Start: Let Y=Y-1; Pause; If Y<0 then Jump Start;"

   Channel 1 To Screen Display FRONT_SCREEN : Rem Move screen up
   Channel 2 To Screen Offset FRONT_SCREEN : Rem Move bitmap
   Channel 3 To Screen Size FRONT_SCREEN : Rem Change height
   Channel 4 To Screen Offset BACK_SCREEN : Rem Move bitmap

   Amal 1,AML1$
   Amal 2,AML3$
   Amal 3,"Let R0="+Str$(SCH)+AML2$
   Amal 4,"Let R0="+Str$(SCH)+AML2$

   Rem Start hardware scrolling
   Amal On

   Rem unrem this line to put back screen on top of front screen
   Rem *** Reference 9
   Rem Dual Priority BACK_SCREEN,FRONT_SCREEN

Rem End bit
   Rem *** Reference 10
   Repeat
      Multi Wait
   Until Mouse Key<>0

   Amal Off
   If Mouse Key=2 Then Exit
Loop
```

FIRSTLY, MY APOLOGIES to Rodger Donaldson, whose letter I published in ADU 6. He is, in fact, from Okato, Taranaki, NZ - so now you can establish your fame. -**Ed.**

Dear Sir,

Recently there was a programme on TV about how the Japanese are about to invade Australian retailing. How are they able to do this? The answer is service: training their staff to make the customer feel good. If a customer comes back and spends $100 per week, that is $50,000 in ten years.

You might be asking how this relates to the Amiga that I'm typing this on. During the last weeks of last year, I realised I wasn't going to make the killer presentation I wanted with Bars&Pipes media madness and my non-AGA A3000, good as they are. So I decided to invest in a new A1200 + 4 Mb + 68881 and Scala. Knowing that Scala MM300 was only a matter of weeks away, I carefully enquired about upgrades and was told: "Send in your registration form and in the return mail, you'll receive a free upgrade."

I mentioned this on the registration form. A few weeks later, I received details of Scala MM300 and a bill for $207! Immediately I wrote to the Australian distributor, whose response was: "It costs $207." So I phoned them and they offered to ask the shop where I bought it to give me a refund and then I could buy Scala MM300, when it arrives at a higher cost. In the meantime, I twiddle my thumbs and eventually pay more.

In the past I've ordered Bars&Pipes mail order from Sydney, paid $10 for overnight delivery and still been waiting two weeks later. I then ordered it from the USA and it arrived five days later.

Many people see anyone who complains as being a whinger, but my experience in business is that a person who complains wants to remain a customer. Those who don't just go elsewhere. For crying out loud, I want to support local business, but I think they have to learn to support me, the paying customer.

I could have done my presentation on a de-dongled beta version of Scala MM300, but instead, like a mug, I forked out $400. Next time I hear Australian businesses crying crocodile tears about piracy or the recession, I know where my sympathies will lie.

Prem Karajaal
East Fremantle, WA, Australia

Dear Sir,

I received a large parcel in the post last week. To my surprise, it contained a Pyramid hand scanner. I wish to thank you and Kaotic Koncepts for such a great prize. I have followed your magazine from its first edition and you keep on improving. I wish you well for the future and continued success with the magazine. Once again I thank you for the prize. All I have to do now is find a place for it on my crowded computer desk.

M.K. Merritt
Elizabeth Park, SA, Australia

You're welcome, MK. Without the support of readers like you, and great companies like Kaotic Koncepts, we wouldn't be able to bring you such a great mag. -**Ed.**

Dear Graeme,

Regarding the computer art debate, I feel that art is most certainly in the inception, not the execution. Photographers are recognised as artists and their photos are seen as art, but does this make anyone who has ever taken a photo an artist?

Supreme artist, Kasimir Malevich, created a painting called "White on White". It consisted of a white square painted on a white background of a slightly different tint. You or I would certainly say that it is not art, yet this painting hangs in the Museum of Modern Art in New York. The key here is the thought behind the picture. The fact that you or I think the painting is a load of rubbish does not stop it from being art.

A raytracing program creates a sphere sitting in all its glory in the middle of the monitor screen. Is this art? Certainly someone thought to create it. The computer did not do it alone. Remember computers don't think - they respond to software directions. At the very least, someone had to start the program which created the sphere. It's still someone thinking - albeit not very hard!

Good art is said to inspire a reaction in others, yet an artist can set out to create art which deliberately goes unnoticed. Whether the final execution is computer-generated or not, the common element is that both will require some thought to achieve their purpose.

David Arandle
Perth, WA, Australia

What is really missing from this discussion is a true definition of the indefinable. Who considers art to be so? The general populace, the critics, the artists themselves? There is obviously a difference between holiday snapshots and a moving black and white portrait photograph, but where does one draw the line? The judgment of art must be considered to be purely a matter of opinion and taste, no matter what tools are used, must it not? Therein lies your answer - it's all over to you. -**MB.**

Dear ADU,

It's taken a while, but finally I've saved enough and upgraded from my A500 to a brand new A4000. However, a few developments in the Amiga world have made me stop and think about things. I bought this new machine to eventually (when I save up some more) get into video work, and still hope to be able to play the best games. For these things, I figured that the A4000 was the premier computer, the one to get. I have supported the Amiga for quite a while now, and whilst I will not claim to be anything but a novice, I was disappointed with the overall price of the machine. It seemed to be extraordinarily high, and to make matters worse, I had to buy a monitor separately. Overall, my package cost me a fortune.

I often wonder how it is that Amiga machines can make a dent in the business side of the world, if Commodore continue to charge such prices for their high-end machines. The thing that bugs me is that it isn't sold with a monitor as standard! Surely Commodore can see that their machines would be more cost effective if they came with a monitor at no extra cost. Perhaps some software to get up and running (not Workbench!) could be included? In fact, I think that all their 32-bit machines should come with a monitor.

Dan
Adelaide, SA, Australia

Well, Dan, you make some interesting points. Amigas, especially the A4000, seem to be highly priced. But, like any product that is made in small quantities, compared to other types of computer, it is going to be comparatively higher in price. By buying an Amiga, you are joining an exclusive club, There may be four million Amigas worldwide, but compared to the squillions of PCs, it is but a drop in the ocean. The only reason PCs are cheaper than Amigas is that more are made, and therefore production costs per unit are reduced.

Your other comments are a bit misdirected. It would be nice to have an Amiga bundle with software and monitor, but what you don't seem to realise is that it will only increase the cost to the end-user, if more is added to the package. Even with PCs, as you mention, you get all these extras as standard, but if you asked to have them left out of the bundle, you would get a discount. Doesn't this tell you that you ultimately pay for it anyway? There is never anything at "no extra cost". If someone can sell you something at "no extra cost", it means the original piece of equipment is costing them less - instead of dropping the price, they still make the same money by selling you something else off their shelf.

There are bundles available for the A1200 which include monitors, which are, of course, more expensive than a plain A1200.

And who says that all Amiga owners want the same monitor? Only two out of our five Amigas use Commodore monitors. Bundled monitors, and Commodore's especially, are of inferior quality, compared to most other brands, like NEC, Sony or Philips. So let buyers choose their own monitor and it will probably save them money. I'm surprised that you weren't offered a bundle when you made your purchase. -**Ed.** ∎

COMMUNICATION BREAKDOWN

*This issue, **Thomas Scovell** de-mystifies Bulletin Boards.*

ONCE AGAIN WE enter the wide world of telecommunications. This month I take a look at what BBS File Bases offer, and how to make the best use of them.

An Introduction

The lure of obtaining software for next to nothing draws many people into Comms. Once online, you have at your fingertips the power to obtain a wealth of files with great
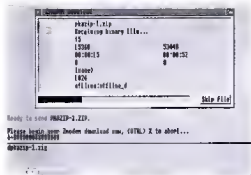
ease. The process of getting a file off a BBS is known as "downloading", while sending a file is termed "uploading". Both are as simple as remembering the two names!

What You Need

To obtain files from a BBS requires an Amiga, a modem and Comms software compatible with the Bulletin Board you wish to use. As mentioned in past columns, several items are particularly important when downloading and uploading files. The faster your modem the better, when downloading. With a 14.4k modem, a 400 Kb file will take only 3.5 minutes to download - on a 2400 baud modem, the same file will take 28 minutes. Faster modems are invaluable for those on toll calls or facing BBS time limits. Correct protocols and archivers for the BBS and software you wish to download are also necessary. (Both aspects are discussed later in more depth.)

File Bases

Files on Bulletin Boards are often separated into file bases or file areas, each of which have certain topics, such as communications, music or utilities. When looking for a specific file, select the area on the Board, then view the list of files in that area. This list generally

contains the file names, a brief description, file size and expected download time.

File Extensions And Archiving

When you look at a list of files on a BBS, you will notice that most have an extension after their name, such as "NComm3.LHA". This denotes the archiving program used to compress the file. Because time online is precious, (especially on toll calls), use of an archiving program to reduce program size saves time and money. The most common extensions are .ARC, .ZOO, .ZIP, .DMS, .LZH and .LHA. Many, e.g.. ARC and ZOO, are outdated and you will find most files on Boards in either
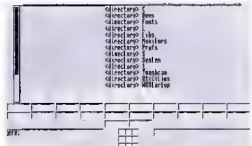
LHA (right) and PKAZip, two of the best Amiga archive programs available.

ZIP or LHA archives. When downloading a file, check first whether you have the correct archiver to handle the file. That way you will not download the file, only to realise you cannot get at it! If you do not have the correct archiving program, you should be able to find it on the same Bulletin Board. Experienced Comms users build up comprehensive stocks of such programs, in order to handle all the files they come across.

Protocols

To transfer a file from the BBS to your computer, both systems must agree upon a method of sending the information. A protocol is a standard way of transferring information between computers, ensuring that no data is lost (error-checking). The main protocols in use are X-modem, Y-modem and Z-modem. All have different ways of transmitting the data and all include some form of error detection. Of these three, Z-modem is most popular because of its efficiency and speed. All common Amiga Comms software, such as

NComm and Term, support these protocols.

Rules To Download By

As with all areas of Comms, rules govern files on Bulletin Boards. These differ between BBSs, but general rules apply. Most BBSs have what is known as an upload/download ratio - a figure such as 8:1, which means that for every eight files you download, you must upload one. This ensures that users do not simply "leech" files from a Board, but give something back. Some BBSs also have a file-size ratio, which, in the case of 8:1, means that for every 800 Kb of files you download, you must upload 100 Kb. The most stringent rule, when it comes to uploading software, is the prohibition of commercial material. Spreading pirated files via a BBS is illegal and you are likely to be kicked off a Board for doing so. Making sure files are virus-free before uploading them, is also essential. Viruses can spread rapidly via BBSs and it
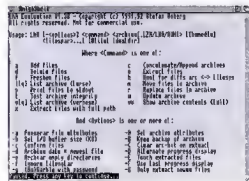
pays to be very careful. Sysops don't take kindly to users who spread viruses over their Boards, whether advertently or inadvertently.

Downloading Made Easy

Downloading a file from a BBS is a relatively simple process, which becomes second-nature with practice. Before logging on to a BBS, you must set up your Comms software - essentially the specification of a download directory (to which the file will be sent) and a protocol. In the case of the download directory, it is best to use RAM if you have enough memory. Downloading to RAM is much quicker than to disk and, for users with fast modems, noticeably speeds up download times. Otherwise, make sure you have a blank disk ready, as there is nothing more infuriat-

ing than running out of disk space halfway through a download. Remember that it is necessary for both your system and the BBS to use the same protocol for downloading. You must often select your preferred protocol when logging on to a BBS for the first time, so set your software accordingly. Other BBSs allow selection of protocol type just before downloading. Once you are logged on to a BBS and have gone to the file area, there are several ways to go about downloading. Generally you can use the [D]ownload option and type in the name of the file you want. Or you can list the files available and [M]ark (select by number) those you wish to download. Then follow the BBS's instructions and select the
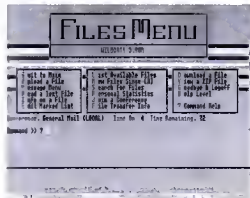
Once on a BBS, it is only a short hop over to the files area...

Download option from your Comm Software's menu at the appropriate time. Depending on the speed of your modem, the file should soon be sitting in your specified Download directory.

Giving Something Back

Uploading is just as easy as Downloading. If the file to upload is not already archived, do so and place it in your specified Upload directory. BBSs often specify a particular archive type to maintain similarity among file bases, so try to stick to that. Then, log on to your BBS, go to the Files section and select

[U]pload. You may then be presented with a reminder of what sort of files that BBS allows. After that, it is just a matter of selecting Upload in your Comms program when instructed to by the BBS. If you upload a file in order to download more files, (in accordance with the BBS's upload/download ratio), you may find you have to wait a day or so to be credited with the upload. The delay is due to checks by sysops on uploads for illegal material and viruses, before allowing them to be put in the main file areas.

That's All?

Once you have downloaded and logged off the BBS, the first step is to dearchive the file with the correct software. When you look at the unarchived program, you may find that extra files have been included with the archive. These often include a description of the file, as well as a text file, stating which BBS it was downloaded from (a type of advertisement). And that is it. Play by the few rules and gain access - through your Amiga and your modem - to thousands of files for very little cash outlay.

BBS Reviews

If you run a BBS and wish to see it reviewed here, drop me a line, C/- ADU.

Paradise BBS, Australia
Phone 61-75-971717

The Australian Paradise BBS is one of an interesting phenomena in Amiga Bulletin Boards. Instead of being run on an Amiga system, it operates on a 386dx40 IBM system. Amiga BBSs are run on IBMs for several reasons. IBM hardware, such as hard drives, is cheaper than Amiga counterparts, so it is less expensive for a sysop to build up a large BBS. And running a BBS on an IBM allows the sysop to have his/her favourite computer, the Amiga, free all the time! As is becoming the norm these days, Paradise runs on a high-

speed, 14.4k modem. The more disturbing side of this trend towards higher speeds is that some BBSs are beginning to restrict the access of slower modem users. Thankfully, Paradise doesn't fall into this category and all speeds are welcome. Paradise BBS has a wide range of files, with support for both Amiga and IBM. The usual file areas include pictures, music and text files, and the BBS offers a wide range of message echoes from many different nets including Fidonet, Astronet and Amiganet. All users should therefore find something of interest. Sysop Barry Ryder says that the BBS content and features are driven by requests of the users. Paradise is a friendly BBS where you, the user, can get what you want as long as you're polite - with the added bonus of free access for all.

Amiga Auckland! BBS, NZ
Phone: 64-9-634-6716

Amiga Auckland! is the BBS for the Auckland Amiga NZ club. It supports club members with member-only privileges, but is also a good BBS for other users, catering for a wide variety of tastes in files, covering topics from communications to art. In 2.x and 3.x-specific areas, Kickstart users can find software to take advantage of their extra features. Although message areas are limited to local echoes, they are still useful, especially if you are having problems of any sort. Other users are always happy to help out in their individual areas of expertise. For DOOR game fans, seven different options include a Wheel of Fortune game, Dungeons adventure and a Star Trek game. The Board runs 24 hours on an Amiga with a Supra v32bis modem allowing all speeds, so there's no excuse for not calling. If you want to meet a bunch of dedicated Amiga users and collect some of the latest files, Amiga Auckland! is the place to do it.

That's the Comms column for this issue: If you have any questions regarding Comms or suggestions for future columns, feel free to contact me C/- ADU or via my Fido point on 3:772/125.5.   ∎

Continued from page 7

A1230
GVP ■ NZ$2195 ■ A$13

THE PERFORMANCE SERIES II A1230 Turbo+ is another worthy product from GVP, available in two options - a 50MHz 68030 or a 40MHz 68EC030. Both have 4 Mb of memory worth noting, GVP memory is smaller and faster than any of the other SIMM modules. Taking advantage of 60ns memory means that memory access time will be far less than with any other accelerator option. The card is the exact length of the trap door hole, so pushing the card into the A1200 actu-

ally levers it into its socket. Fortunately, GVP anticipated this by providing a small, semi-circular cut so that you can indent your little finger to remove the card.
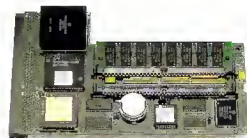
As was stated under CPU options, you usually can't move ROM images around without an MMU. However, GVP have allowed for this in their supplied program, GVPCPUCtrl, which allows the remapping of Kickstart into that 60ns superfast memory! The manual is up to GVP's usual standards and covers every option. A PGA FPU socket is provided, and the FPU must be clocked at the same speed of the CPU. Two SIMM sockets are also provided, allowing for a massive (and very expensive) 32 Mb of memory!

The card is supplied with a DPP Port, allowing the addition of other peripherals available from GVP. The only DPP product available at time of review was the A1291 - an Amiga standard SCSI card, enabling up to six SCSI devices to be connected. The A1291 slides in through the Amiga's rear expansion port, to seat itself firmly into the connector on the edge of the A1230. A securing screw is

inserted through the base of the Amiga.

GVP hope to ship a 16-bit DPP sound digitiser for Amiga music enthusiasts! Due to where and how the DPP Port was mounted on the A1230, it is not possible to replace the trap door cover, without modification, to the seating edge. Again, GVP have allowed for this by supplying, in the A1230 package, the exact part direct from Commodore. Simply put your old trap door cover in a drawer and snap on the new, modified one! ■

Supplied for review by AmiKomp Systems

A1230	
SPEED	★★★★☆
FEATURES	★★★★☆
EASE OF USE	★★★★★
MANUAL	
VALUE	★★★★★

92%

M1230 XA
MicroBotics ■ NZ$825 ■ A$645

ANOTHER FINE PRODUCT from MicroBotics! The M1230 XA has options for a PGA 68030 and a PGA 68882. Unlike other accelerator boards reviewed, the M1230 XA allows the owner to install a CPU and FPU of different speeds. Unfortunately, the board is not auto-configuring - a minor inconvenience. The M1230 XA is shipped with several programs allowing configuration of the card to individual set-ups.

Running SetXA displays a screen of buttons and prompts, allowing you to tell the M1230 XA's onboard configuration chip what is installed in the board. Once this is done, save the configuration, which is written to a non-volatile memory chip on the XA. Unfortunately, the memory is not added to the system's memory on startup.

Two options have been provided by MicroBotics: the first, a SetXA icon with the tooltype AddMEM, which is placed into the
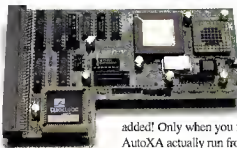
WBStartup drawer. However, as files in the WBStartup drawer are not executed until the LoadWB command is issued, (usually at the end of a Startup-Sequence), this means that your A1200 has booted using Chip memory. As we already know, Chip memory is slow, so the obvious solution is to add the memory to the system before any commands in the Startup-Sequence are issued. MicroBotics have provided a second option - AutoXA - a line placed by more experienced users at the beginning of the startup sequence, which adds the memory to the system and makes itself resident. Whenever your Amiga is reset, AutoXA is executed straight out of memory and the memory added! Only when you first turn on your Amiga, is AutoXA actually run from disk.

When fitting the M1230 XA, I discovered that Commodore had made the floppy disk drive mounting brackets hang a fraction low. On one A1200 I actually had to pull the machine apart to remove the card, while others required gentle persuasion and a certain amount of patience. The card is shorter overall than others, but the shorter, connecting edge piece was 1.8 mm longer than any of

the others, which made removal just that much more of a challenge. But how often would you remove an accelerator like this? Fitting was no more difficult than with any of the other cards.

Unlike the Twelve Gauge, the M1230 XA manual assumes you know where things are on your Amiga (i.e., the trap door). A detailed explanation of how to insert a SIMM into the socket is provided. One jumper needs to be set by the user to indicate which crystal is to be used for the FPU (the main CPU crystal, or the FPU crystal, if a faster or slower FPU is installed). The realtime clock can be disabled by simply removing the clock chip from the board. ■

Supplied for review by The Parts Warehouse

M1230 XA	
SPEED	★★★★
FEATURES	
EASE OF USE	
MANUAL	★★★★★
VALUE	★★★★★

88%

12 A'Clock
MicroBotics ■ NZ$59 ■ A$

MOST OF THE expansion cards mentioned here have clocks fitted as standard, although there was a time when very few did so. If your card did not, MicroBotics have released the 12 A'Clock - a high-accuracy, battery-backed realtime clock for the A1200. Installation requires opening your A1200 case, which may void the warranty. (You may wish to have it

installed by your dealer.) After opening your A1200, you must remove a small, metal plate attached to the main shielding. This reveals the clock header pins. Then simply plug the 12 A'Clock into your motherboard. Do not attempt to install two clocks in your A1200 - it could damage your hardware. If you do purchase an expansion board with a realtime clock, you must disable or completely remove one of these two clocks. ■

Supplied for review by The Parts Warehouse

12 A'CLOCK	
EASE OF USE	★★★★★
MANUAL	★★
VALUE	★★★★

93%

PC1208

POWER COMPUTING HAVE released the first FPU expansion product for the A1200 which can accommodate either PGA or PLCC-type FPUs. The packaging, however, was somewhat misleading, with the product supplied to the consumer in a VHS video cas-

sette case, sporting PC1204 (another RAM expansion product unavailable at time of review) advertising. The board can be expanded to a maximum of 8 Mb, via the use of a SIMM module in its single slot. When I first heard about the PC1208, advertising indicated it had two SIMM slots. This is not so, and Power Computing have duly apologised. The board was almost completely auto-configuring - just as well, because no instruction manual was to be found, either inside or outside the lunch bag in which the card was packaged. Three jumpers found on the board had to be correctly configured, to allow for use of an FPU. I contacted the suppliers to find out what the jumpers did, in order to test various FPUs. Power Computing's theory is that the user does not need to know what the jumpers do; they only inform dealers. If you

decide to upgrade this card yourself, you will need to obtain the necessary information, or be prepared to try every configuration until it works! The board has one crystal slot and can use any 6888x series maths coprocessor. A realtime clock comes as standard. ■

Supplied for review by Micro-World

PC1208

SPEED ★ ★ ★ ★
FEATURES ★ ★ ★
EASE OF USE ★ ★ ★ ★ ★
MANUAL ★ ★ ★ ★ ★
VALUE ★ ★ ★ ★ ★

88%

MBX 1200z

THE MBX 1200z gives the A1200 user the option of installing an FPU of any available speed, and adding up to 8 Mb of Fast memory, via a single, 72-pin SIMM slot. The battery-backed, realtime clock can be disabled by removing the clock chip from the board. Software is provided with the MBX 1200z to allow configuration by the user. With PCM-CIA cards, a program splits an 8 Mb SIMM,

placing 5.5 Mb before the PCMCIA start address, and 2.5 Mb after it. The 2.5 Mb must be added manually by the user (usually via the Startup-Sequence, or with WBStartup). The board does not auto-configure and users must set four jumpers to tell the MBX 1200z exactly what is present. A diagram is provided, with arrows explaining each jumper. ■

**Supplied for review by
The Parts Warehouse**

MBX 1200z

SPEED ★ ★ ★ ★ ☆
FEATURES ★ ★ ★ ★ ☆
EASE OF USE ★ ★ ★ ★ ★
MANUAL ★ ★ ★
VALUE ★ ★ ★ ★ ★

90%

Memory

THE AMIGA 1200 is capable of being configured with three different types of memory - Chip, Slow or Fast. The 2 Mb of RAM with which the A1200 is shipped, is Chip memory, accessed by all the Amiga's custom chips, where screen images - the pointer, music, graphics, etc. - are stored. If a custom chip needs to read memory, it must be in Chip memory. Slow and Fast Memory can only be accessed by the CPU. Slow memory is 16-bit memory, introduced to the A1200 only through the PCMCIA port. The resulting bottleneck, due to the PCMCIA's 16-bit architecture, compared with 32-bit for the A1200, severely taxes the Amiga's ability. Users are soon to discover that using 16-bit memory is like driving a Porsche with the hand brake on! Fast memory, on the other hand, is true to its word. With the addition of only 1 Mb of Fast RAM to your Amiga, it will perform many times faster than its original speed.

DKB1202

IF YOU ARE considering the addition of memory to your Amiga in cheaper units, this card is probably your best choice. With two SIMM slots, the owner can upgrade memory in configurations of 1, 4, 5 or 8 Mb blocks, making the DKB1202 a very attractive package for entry-level RAM expansions. Place a 1 Mb SIMM on the board at the time of purchase, and later add a 4 Mb SIMM. A 16MHz PLCC 68881 is provided on the board, which can be upgraded through DKB to a 25MHz 68882. The DKB comes standard with a clock. A small utility - MagicMEM - overcomes the PCMCIA address problem. Only if you are using a 1 Mb SIMM module (1 or 5 Mb configurations›), or if you have 8 Mb of RAM in your DKB1202 and plan on using PCMCIA devices, will you need to use this utility. Configurations in which there is a 1 Mb

SIMM present (1 or 5 Mb of total memory), correctly add that 1 Mb to the system. If you do not run the program, this memory will not show up on the computer. DKB recommend placing the command in the WBStartup drawer, but any experienced Amiga user should place it in the startup sequence. The board comes with three jumpers, and a manual explaining in detail the different memory configurations. ■

**Supplied for review by
The Parts Warehouse**

DKB1202

SPEED ★ ★ ★ ★
FEATURES ★ ★ ★
EASE OF USE ★ ★ ★ ★
MANUAL ★ ★ ★ ★ ★
VALUE ★ ★ ★ ★ ★

87%

PGA or PLCC?

PIN GRID ALIGNED (PGA) or Plastic Leadless Chip Carrier (PLCC) indicates the design of the chip. A PLCC chip is a flat, square slab, with many shiny, metal leads folded around its edges, which fits into a socket shaped like an open box. A PGA chip is a flat, square slab with many stiff wires (pins) protruding downwards, which fits into a socket with many rows and columns of holes. Only the PLCC-type chip is keyed, which means it can only be inserted in one orientation. The PGA FPU, however, is not keyed, and only a mark on one of the corners indicates its correct orientation. If power is supplied to an incorrectly-oriented FPU, you can pretty much kiss it goodbye. If you are unsure of the correct orientation, ask your dealer for assistance. They should have the tools and anti-static equipment necessary to ensure that your product remains operational.

An endless procession of additional cards is being produced by these and other companies, for expansion of the A1200 - the DKB1240 and PC1204 are examples. When such cards come into our possession, we will print a More Power addendum, which will also detail the variety of A1200 SCSI controllers, comparing them for speed and CPU usage.

(Top charts)

Execution Speed: 68020 vs. 68030
Axis: 14.3 MHz, 16 MHz, 25 MHz, 33 MHz, 40 MHz, 50 MHz
14.3 MHz 68EC020 Stock A1200
68030 at various clock speeds

Memory Transfer Speed (with onboard SIMMs)
GVP A1230 · Microbotics M1230 XA · CSA Twelve Gauge · Stock A1200 · PCMCIA Card

FPU Performance: 68020+68882 vs. 68030+68882
Axis: 14.3 MHz, 16 MHz, 25 MHz, 33 MHz, 40 MHz, 50 MHz
14.3 MHz 68020 + 68882 FPU

Execution speeds: 68030 under different options
CSA ... Gauge ... 30 ... M1230 A
Cache + Burst on · Burst on only · Cache + Burst mode off · Cache on · Burst mode off · Cache + Burst on

MORE POWER! COMPARISON

● Yes | (blank) No | ◇ May be fitted by user after purchase

	68881	14.3MHz	16MHz	20MHz	68882	25MHz	33MHz	40MHz	50MHz	FPU = PGA	FPU = PLCC	INDEPENDENT CPU/FPU SPEED	68030	25MHz	33MHz	40MHz EC	40MHz	50MHz	CPU = PGA	CPU = PLCC	SCSI ON CARD	SCSI DPTION	SIMM SLOTS	MAX MEM (Mb)	CLOCK	DISABLE CLOCK	PCMCIA
Twelve Gauge					●	◇	●	●		●			●	◇	●		●	●			●		1	16		●	●
A1230					●	◇	●	●		●		●	●	◇	◇	●	●	●				●	2	32		●	●
M1230 XA					●	●	●	◇	●	●			●	●	●	●	◇	●					1	128		●	●
MBX 1200z	●	●	●	◇	●	●	◇	◇		●													1	8	●	●	
PC1208	●	●	●		●	●	●			●	●	●											1	8	●		
DKB1202	●	◇	●	●	◇	◇	◇	◇	◇		●												2	8	●	●	
12 A'Clock																							0		●	●	●

WORD for WORD

RAM

RAM (Random Access Memory) is the computer's primary working memory. It is called "random access" because any byte of memory can be accessed in any order ("randomly") at the same speed.

ROM

Memory chips called "ROMs" (Read Only Memory) are chips that permanently store instructions and data, and hold codes and programs. The contents are placed into the ROM at the time of manufacture and cannot be altered thereafter.

EPROM

An EPROM (Erasable Programmable Read Only Memory) is a reusable ROM-like chip, that holds its contents until erased by being exposed to ultraviolet light through a special "window" on the chip, which is normally covered. A special device called an EPROM-burner is used to store the data on the chip.

SIMM

Single Inline Memory Modules are small printed circuit boards that hold a handful of memory chips. They are used as the standard

form of memory chip in the Amiga 4000, and on various Amiga 1200 expansion cards.

DRAM

Dynamic RAM is the most common type of electronic memory used in computers today. DRAM architecture usually uses one transistor and a capacitor that holds a charge to represent a 1-bit. The capacitors must be energised hundreds of times per second in order to maintain the correct charges.

Bitmap

In computer graphics, a bitmap is the area in the computer's memory that represents the video image. For monochrome screens, one bit in the bitmap represents one pixel on screen. For greyscale or colour screens, several bits in the bitmap represent one pixel or group of pixels on the screen.

Bitmap refers to any binary representation in which each bit or set of bits corresponds to some object or condition.

Multisync Monitor

A multisync or multifrequency monitor is a display monitor that adjusts automatically to any one of a number of synchronisation frequencies, sent to it from a computer's video display hardware.

ASCII (ass' - kee)

American Standard Code for Information Interchange is a binary code for data, used extensively in communications, by most minicomputers and in all personal computers. ASCII was originally a 7-bit code allowing 128 possible character combinations, the first 32 of which are used for communications and printing control purposes. Since today's common unit of storage is an 8-bit byte and ASCII is only 7 bits, the extra bit has been used as a parity bit, or for the addition of a variety of different symbols to the character set. ■

everything growing at the same time."

He worked in several advertising agencies, and was fortunate to find his feet under one particular designer who stimulated his staff to pursue their particular interests. At a time when Holland was a "closed society", and professional fields were difficult to enter, such encouragement was a breath of fresh air.

Paul Nicolai and Yvonne Westra: "...a much richer design environment in which to work."

Paul's fascination lay in new forms of technology, especially the new medium of video.

He later worked for top agencies in both London (Compton) and Antwerp (Moussault). He was, however, to bide his time, until the lure of greener pastures took him half-way round the globe. Convinced that there had to be more to the world than Holland, he applied for the scheme to travel to New Zealand for two years - for $20. ("If you wanted to return within that time, you had to pay part of the fare.") He was accepted, packed his bags and left in 1974 - and has never returned.

Paul walked into an advertising job in Wellington. Work was a challenge and living here was like being continuously on holiday,

with the bonus that the commercial video option was much more accessible. "In New Zealand, if you had creative ability and were keen to achieve specific results, nobody would stop you," he reminisced. "Your own determination got you into certain areas."

He met Yvonne in Wellington, eventually joined her in her rented shearer's cottage in the Wairarapa where she was enjoying an exercise in self-sufficiency, supplemented by freelance design work in Masterton. They later moved to Auckland, where the dream of continuing a similar lifestyle was shattered by the realisation that computers and photography were expensive mediums, unable to be financed from living off the land.

In 1982, Paul completed a programming course and purchased his Apple, later discarded in favour of the Amiga which immediately caught his attention by its ability to change the colour of his presentations. One client at Caxton wanted paper patterns - serviettes and Christmas paper designs - and Paul experimented in his own time, away from the advertising agency - "at that time, nobody at work wanted to know about computers. I don't think the Macintosh was around then, but when it came, it was black and white and that was not what I wanted. It was great for DTP, but no good at all for any colour work."

Amiga was the choice, and Paul began with the A1000 and progressed from there. The final chapter - until the next radical advance in technology - is yet to come in the form of Yvonne's digital darkroom.

Auckland-born Yvonne (also of Dutch heritage), turned to photography from art, inspired by a collection of photographs

expressing an emotion she had previously thought impossible within that medium. Her former art school graduate's prejudice against photography evaporated with the desire to capture similar emotion in black and white, and she experimented with a passion.

Metro also benefited from her artistic bent, and published a heartrending series of pictures illustrating animals in captivity. What draws her as much to photography as the view through the camera lens, is the printing process: "I've never been one to just take a picture, develop it, put it through the bath and that's it," she says. "I like to print expressively. I've always thought if I lightened or darkened certain areas, I could make the picture more dramatic. I was spending a long time on my prints, going through boxes of paper to achieve the one which expressed exactly what I wanted. So digital photography will be excellent for the way I have always worked. I'll be able to manipulate the image on screen and then make the print."

A collection of negatives with the potential for prints bearing her distinctive flair are that much closer to fruition, with Paul and Yvonne's plans - when finances allow - for either a CD-ROM or perhaps a scanner. Ideally, a CD-ROM to read Kodak CD files created from Yvonne's conventional work, (by scanning the negatives), so that the images can be manipulated and printed out as beautiful photographs.

Smiles Paul: "That will give Yvonne plenty of scope. We will have to ensure that we have enough memory to manipulate the images - but it's only money, isn't it?" ∎

A familiar logo from the Aura Creative team.

Issue 7's PD Disk contains three rather useful utilities - now available to all readers - and here's what they do...

The ADU
PD Disk

To receve the PD Disk with each ssue subscribe now by f lling out the form below
A so on PD Disk 7 is the h licopter object from Imagineer and code for PostScript and Amos

SuperDuper 3.0
by Sebastiano Vigna

SPEEDY DISK COPIES, anyone? The third incarnation (according to the author, a completely new program) of this popular disk copier/formatter is even faster than ever, on any Amiga. A full verified disk copy takes less than 100 seconds. With buffering - SuperDuper supports both RAM and hard disk buffers - verified duplications can be made at a rate of around one a minute, and disabling verification almost halves these times!

SuperDuper 3.0 requires Workbench 2.04 or higher to run. New features include high-density disk support, XPK compression support, a graphical progress display and a much-improved buffering system.

Complete documentation is supplied in AmigaGuide format, and the author suggests that the documentation be re-read by existing users, because of major changes in program operation.

ReOrg 3.1
by Holger Kruse

REORG IS A complete disk optimiser and file-system converter. A word of warning - make sure you have a backup of the drive you intend to optimise! Disk optimisation improves data layout, which speeds up access time for the floppy or hard disk. As optimisers go, ReOrg is fast. A 68000-based Amiga can optimise a standard floppy in less than two minutes, and a 68030 will optimise a 40 Mb hard drive partition in three minutes!

ReOrg 3.1 requires Workbench 2.04 to run, and documentation is supplied in AmigaGuide format, which can be accessed through ReOrg's on-line help function, provided you have the amigaguide.library installed. Features updated from version 2.33 include directory caching support, file-system conversion, improved optimisation algorithms, localisation and a completely font-sensitive interface.

Virus Checker 6.33
by John Veldthuis

GET RID OF the nasties with the latest release of the world's premier Amiga virus detection and eradication software, from New Zealander John Veldthuis (a member of Safe Hex International). Version 6.33 contains bug fixes and identifies several new viruses. For optimum results, it should be run on startup - it's a commodity, so just place it in your WBStartup drawer.

Virus Checker runs under all versions of Workbench. However, some features (including the GUI) are only available to WB 2.04+ users. Again, AmigaGuide documentation is supplied, covering full installation for all Workbench versions.

*Not quite a Disney hero, but rather another member of the Amiga raytracing/animation club. **Dudley Storey III** creates some mirrored balls on chequered surfaces with...*

Aladdin 4D v3

Adspec Programming ■ NZ$795 ■ A$645
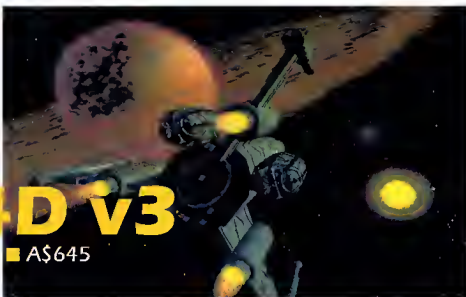
COULD THE LATEST incarnation of Aladdin 4D be the mythical genie for animators and artists alike, fulfilling every wish for 3D art on the Amiga? Let's rub the lamp and find out...

Aladdin's hard-bound package contains five disks, a thick manual and two tutorial videos, each approximately two hours long. Unfortunately, the videos are NTSC (American television standard), so unless you have an NTSC-compatible VCR, you'll miss out on the informative tutorials they contain.

Installing Aladdin's software was a breeze. A hard drive is almost mandatory for operation of Aladdin, since it constantly addresses its files for data, although it could be run from floppy. The manual recommends at least 10 Mb of memory, a 68040 processor and the largest hard drive you can get. Mere mortals can use Aladdin with 2 Mb of memory and a maths coprocessor.

The view of the program's main screen, the "world" in which you create and move your objects, is similar to that of Caligari: a gridded plane with X, Y, and Z axes. Everything is run from this editor and a rendering screen. There are no separate modules. However, many options can lie buried beneath three or four windows - click one button in a window and another opens, and so on.

Another feature Aladdin shares with Caligari is its ability to use different shading procedures (Faceted, Gouraud and Phong) on different objects, or even on different facets of the same object. An object's ability to cast or receive shadows can also be changed.

On startup, the world is slowly turning around an empty origin, which is pretty cool. You can alter this rotation from the keypad in any direction or speed, zoom in and out with the cursor keys, or freeze it in any view. The program opens configured for an NTSC Amiga, thus missing about a fifth of the screen at the base of the display. You can change this to fit it in a PAL monitor, but Aladdin does not remember the change the next time you open it.

Mirror Writing?

The manual contains inevitable mistakes. Significant changes and additions were made to the program, after the manual was printed, and corrections are published in an addendum and a disk file. On top of that, the author might have been looking at the program's display in

a mirror - whenever he says "...in the window on the right of the screen...", you can be sure it's on the left. He also makes the fatal mistake of assuming that the reader has followed his suggestions and become familiar with the reference section at the back, before continuing with the tutorials at the front. This results in extreme confusion for people with little patience like me, who want to get straight into a program and read in a blur, since the tutorials use commands like "set the ATP to the origin", without further explanation.

Object Creation

Aladdin takes the standard approach of allowing users to make objects by defining points and joining these to form a planar surface, or using primitive objects such as Platonic solids (dodecahedrons, octahedrons) or Quadratic solids (hyperboloids, torii and ellipsoids), rectangles, spheres and arcs. These are given shape by entering radii, polygon count and further dimensions. Many objects can be created this way, but some knowledge of solid geometry is required. Polygons may be further altered by extrusion, sweeping, deformation by a spline curve, stretching, mirroring, rotating or scaling by the "external tools". Technically, these tools are first-rate, but operationally, hampered by Aladdin's odd mouse control. The left and right mouse buttons perform different operations on the screen, similar to DeluxePaint's interface. A left click activates a function or places a point or an object; a right click presents a window giving the options of the icon, or places the ATP

(attachment point, as I found out). In practical terms, a line "clings" to the mouse until TAB is used to add a point. Generally, the interface is consistent, but takes some adaptation.

Aladdin's tools are closest to Real 3D in application. Like Real 3D *(reviewed in ADU 4)*, Aladdin has a large toolbox of icons ("internal" tools), a full menu, and an alphabetised, scrolling list of further tools ("external" tools). If you have used the Public Domain Tool Manager in the Amiga's Workbench, you know exactly what Aladdin's external tools are like. Each entry selected in the list runs a small independent program such as Scale, Extrude, Deform or Spotopol (which converts splines to polygons or vice versa), on selected objects. Entries can also refer to simple Shell scripts to, for example, run other programs such as DeluxePaint to multitask with Aladdin. The beauty of this system is that it allows experienced programmers to write their own routines for an external tool and share them with other Aladdin users. Some should be available on Adspec's own magazine disk for Aladdin users.

By the Numbers

Aladdin is number-intensive, by which I mean that many entries - for example, to change the attributes of an object or the frequency of a wave action - must be entered by hand on the keypad, making for extreme accuracy and variability, at the expense of large windows, filled with nothing but list entries of numbers.

The easiest, most open approach to object deformation (or "morphing"), cloning and

Aladdin's gas capabilities are among its most impressive.
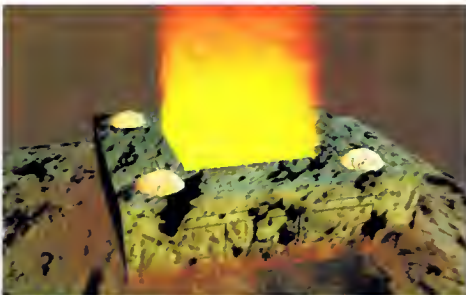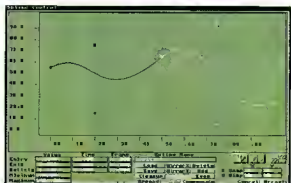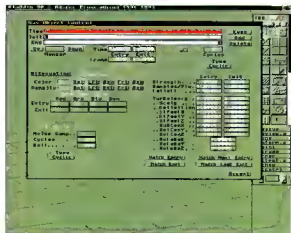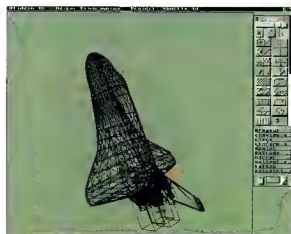
Aladdin 4D falls somewhere between Imagine's versatility and Real 3D's power.

path assignment I have yet found, is in Aladdin 4D. Paths are created from simple splines or polygons, no different from those used to form other objects. Paths may be assigned or controlled by other paths to create complex motions (a piston on the end of a driveshaft, for example). Particle animation in Aladdin is represented by the "Instancing" feature. Any object may have an unlimited number of its clones or "instances" appear only for the purpose of animation. These remain invisible in Aladdin's Object editor, but are controlled incrementally by the forces that shape the original object such as paths. Motions such as a roller-coaster ride, a flapping wing or a bullwhip, are very easy to create. Objects are not saved individually *per se*, but as "Drawings" containing the entire description of the scene. The inclusion of an "Append" function in the menu is thus a godsend, for the purpose of loading other drawings into an established scene. Draw 4D, DEM (Scenery/Animator/Vista landscape format), EPS, and .GEO (Videoscape) objects are also supported. However, Aladdin will only save objects in its own proprietary format or .GEO.

Continuing the drawing metaphor, projects may have more than one "page", called spaces. Moving to another space is like stepping to another part of Aladdin's universe, or going to another page on a word processor. Each space may have its own lighting, cameras and paths, but shares common values, such as backgrounds and rendering options. However, spaces may be rendered separately.

The Garden Path

Aladdin has the strongest controls for paths I've seen in an Amiga animator, and that includes Imagine. Last issue's Imagineer tutorial, for example, contained a bouncing ball that did not speed up or slow down during its rebound, as it would in the real world. Such an effect is difficult to achieve in Imagine, but Aladdin can handle it with ease. In fact, one of its tutorials contains an example of just this effect using csplines. Roughly speaking, a cspline is a curve or series of curves that control how a function changes over time. They are most commonly used for speeding up or slowing down an object's motion on a path, but, in fact, can be used to control any function that changes over time, such as colour, gas turbulence, wave action, instancing, lights, and more. And like paths, csplines may be commanded by "member" and "global" csplines higher in a hierarchy.

Csplines can also control textures for strength and other effects over an animation. Aladdin's procedural textures are stored as JPEG files, which is pretty clever, and can be used as Normal, Bump, Reflection, Transparency, Illumination, Genlocked, Opacity and Hardness maps. Objects can be further manipulated with the addition of fractal noise maps (an advance unavailable until recently for most other raytracers). Your own IFF images may also be loaded in as brush maps, backgrounds or foregrounds.

Purple Haze?

Every program has one feature that sets it apart from the rest, repeatedly used in demos to blow the socks off spectators. Without doubt, that feature in Aladdin is the ability to model gas, with turbulence and lens flare effects. Gas is held inside a container (by default a cube), and can be fully animated, with fall-off, attenuation, multi-coloured turbulence, modified strength, roll, rotation, and resampling (to make a coarser or finer gas). Modelling these effects, even in a program that doesn't do true raytracing, like Aladdin, is a complex process (requiring careful thought, especially across an animation), as well as being computationally expensive (i.e., you can be waiting a long time for a picture to resolve, especially at higher sampling rates).

Impressions

What wishes would I make to improve Aladdin? My first would be for an animation

player. None is built into Aladdin, apart from a black and white, wire-frame, preview mode - a loss I find inexcusable. The manual suggests using another program, such as DPaint, to display animations. It seems a pity that a raytracer which can produce such dazzling images, cannot display more than one at a time. For the price, Aladdin should contain an animation player.

My second wish would be for more fonts. Aladdin fails to convert fonts to objects for use in animated titles. It does, however, supply its own pre-packaged fonts, (but only five). Similarly, Aladdin will not form a flat, 2D object from an IFF image, but will allow you to load a picture into the background of the editor and manually trace around it, zooming in for detail.

Lastly, I'd ask for a smoother interface, one that remembers preferences for screenmodes and replaces the majority of numerical requesters with more tools, like its excellent Spline editor.

Also detrimental to the program are the use of dongle protection (without a pass-through to chain other dongles together), and the lack of an UNDO feature. Controls over lights are few, although realistic, (measuring fall-off in light intensity as the square of the distance from the source).

As an object-designer, animator and renderer, Aladdin is an accommodation, somewhere between the power of Real 3D and the versatility of Imagine. It retains far too many places where numbers must be punched in for ease of use, but contains features such as gas, instances and flares which cannot be produced in many other Amiga raytracers. If those are your particular needs, with strong texture procedures and paths thrown in, (especially if you are outputting to a 24-bit frame buffer), I'd recommend Aladdin. ■

**Supplied for review by
The Parts Warehouse**

ALADDIN 4D v3

SPEED ★★★☆☆	OCS / 1.3	✓
FEATURES ★★★★☆	ECS / 2.0	✓
EASE OF USE ★★★☆☆	AGA / 3.0	✓
MANUAL ★★		
VALUE ★	**80%**	

DISCOGRAPHY
by Dudley Storey III

Liberation: Captive II
Mindscape ■ NZ$99 ■ A$70

THIS IS THE only CD³² program I've seen that approaches the potential of Commodore's awesome new games platform. Liberation - Captive ll has a great intro, masses of crisp, sampled speech, raytraced graphics, and a good plot.

The year is 2898. Earth is in its usual state of decay, corruption, oppression by big business, and pollution, only more advanced. Pacification of the populace is enforced by security droids. Unfortunately, the new XLVI model tends to malfunction during magnetic storms, resulting in nasty human deaths... which its manufacturer, Securi-Corp, is desperately trying to cover up.

You have your own four remote-controlled droids (an earlier, safer model), and an ambition to uncover the truth. To do this, you must find and free the witnesses to the security droids' "accidents", kept imprisoned without trial in Securi-Corp's own detention centres, scattered through the nine zones of the city.

The city - the entire environment - is fully

realised in 3D textured AGA graphics. There are rooms, buildings, sewers, an underground and upper level, cars and taxis on the street (which can either run you over, or be appropriated for your own use), computer terminals, shops, police

stations, and more. You can interrogate the denizens of the city (who actually speak, with sampled voices), bribe or threaten them, if they don't give the information you're after. Shoot up everything in sight and you'll have the cops after you; become damaged and you'll have to find a power outlet to recharge (the drain of which Securi-Corp can detect and trace), or a store that sells droid parts.

So it's another adventure game, similar in design to Syndicate, Hired Guns or Space Hulk. And the plot reminds me of Pepe Moreno's *Batman - Digital Justice* graphic novel. But for exploiting the graphics and sound potential of the CD³², this game has no equal. The 3D environment scrolls smoothly in any direction (with
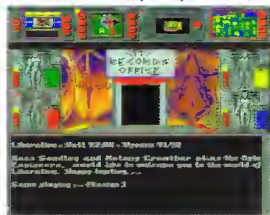
options to look up, down, left and right at 45 degrees to the main axis of travel); the music is atmospheric; the speaking roles well done. The game even has intelligent use of the CD's controller - each of the four coloured "action buttons" corresponds to a droid of the same hue. And the game will modify itself if you want to play for strategy or action.

The clarity of the manual, a mix of storyline and instruction, could be improved a little. And speaking of clarity, check the game if you have connected your CD³² to a television. Early televi-

sion models with a low dot-pitch or resolution may smear or cut off some of the fine detail that Liberation uses in its display, making some of its small icons difficult to read.
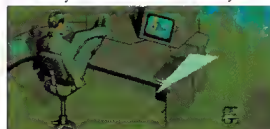
If you want to impress your Sega Master Drive platform-playing friends, or just experience a good adventure role-playing game, this is it. I predict Liberation will be the definitive game of the early CD³² era.   ■
Supplied for review by Micro-World

GRAPHICS ★ ★ ★ ★ ★	
SOUND ★ ★ ★ ★ ★	**ADU APPROVED**
ADDICTIVENESS ★ ★ ★ ☆ ☆	
PLAYABILITY ★ ★ ★ ★ ☆	**90%**

Nigel Mansell's World Championship
Gremlin ■ NZ$99 ■ A$70

A PERFECT EXAMPLE of what a game could have been if designed for the CD³², rather than converted from a standard game.

Now that Nigel Mansell has left Formula 1 for Indy, you have the opportunity to fill his flame-retardant racing suit. The full Grand Prix season is ahead, but Nigel has not left you defenceless. Before racing a single lap, you can go to the Driving School and work on a particular circuit, without having to worry about other cars, or Improve With Mansell, in which the master himself guides you through the selected track.

Before entering a race, you'll want also to fine-tune your car to the conditions - wet, hard, or soft tyres, gear ratio for automatic or manual shift, and aerofoil design. Finally, you can qualify to achieve a better grid position at the start. The actual race side of World Championship is nothing to write home about. You can experience it in full race mode, with the track, speed, gear, tyre conditions and race placings in a "head up display" on the screen, or as an arcade, with only the speedometer present. Graphics are only moderate, with flat, blocky 2D sprites, rather than the 3D vector approach of games like Indianapolis 500 or Virtua Racing.

A little imagination shows what could have been possible here. Why do Nigel's suggestions for better driving appear as text in the top of the screen during practice, diverting your attention from the road, when his words of wisdom could have been sampled and replayed loudly over the sound of the engine? Or even better, digitised video frames of him speaking, rather than a few frames with his mouth moving up and down? And I need better advice than "Avoid hitting objects" and "Keep on the road." (All right, so I'm not a very good driver.)

The controller of the CD^{32} is surprisingly pleasant to use for driving. With my thumb on the centre of the direction pad, I had no problems arcing through corners (and off the track). I hope other racing simulators take advantage of this.

As a racing game for a standard Amiga, World Championship is adequate. But the areas open for improvement on CD are so clear. Why can't designers take advantage of the dedicated 68020 chip inside? It's not a wimpy A500 68000. CD^{32} buyers will very quickly differentiate between games which are simply conversions of Amiga titles and those designed with the CD^{32} in mind - games programmers, take heed. ■

Supplied for review by Micro-World

GRAPHICS
★★★☆☆
SOUND
★★★★★
ADDICTIVENESS
★★★★★
PLAYABILITY
★★★★★
68%

Sensible Soccer
Sensible Software ■ NZ$99 ■ A$70

ONLY THE ENGLISH could make a computer game out of soccer - a sport in which victory is usually achieved with a single goal (celebrated by mass cluster-gropes on the field by the scoring team), or, more often, tied without a single goal being scored - and, to boot, a game which won a European Golden Joystick award as game of the year in 1993. Fortunately, Sensible Soccer manages to compress an hour and a half of this tedium into three to ten minutes of relative excitement.

As you can probably tell, I am not a major fan of soccer. But as a soccer simulation, I was impressed with Sensible Soccer's depth. The Amiga-disk version was reviewed in ADU 2, almost a year ago. What's changed?

The answer, in short, is "not much". Teams can still be selected from around the world, with colours and names changed, and team play revised. Unlike the disk version, however, you can't save these changes, unless you have a floppy drive connected to the console.

The argument as to whether the controls for "aftertouch" or spin on the ball have been improved with their conversion to joypad, is one of personal preference. I find it too easy now to loop my player around the ball, losing contact with it.

Another criticism. The method for selecting teams is ridiculous. Although I had a huge range of options, from local British sides up to European and international teams, I couldn't control my players until I read the manual closely, and worked out that I had to press the fire button twice on the team I wanted to play (a method not specified in the manual). The game should recognise the number of joypads connected to the console and configure the game for that number of players, with computer vs computer as an

FRIENDLY

ALBANIA v UKRAINE

option, not the default.

During play, the sound of the crowd, chanting, stamping and oohing at near-missed shots at goal is quite effective, but occasionally a laser-like or flanged quality echoed through my television speakers, possibly from re-sampling effects. Also, for me, the players were too small
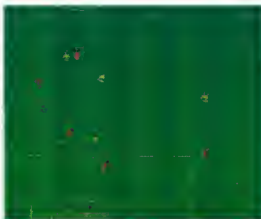
Sensible Soccer ..where are the sampled Liverpool crowds and red card animations?

on the field, scurrying around like hyperactive ants.

Again, CD technology could have been used to deliver so much more here. What about the sampled anthems of a Liverpool crowd on their home turf taken live from a game, rather than the three to four second loops that Sensible Soccer uses? Why is the reserve players' bench a tiny cornll on one side of the field, when a full screen picture, or, even better, an animation, could have been used when you called the manager or coach? Sensible Soccer version "1.1" has much to improve before being my sports game of choice. ■

Supplied for review by Micro-World

GRAPHICS
★★★☆☆
SOUND
★★★☆☆
ADDICTIVENESS
★★★★★
PLAYABILITY
★★★★★
68%

THE

ACTIVISION

GAME GRID

by Dudley Storey III

The Settlers
Blue Byte ■ NZ$119 ■ A$80

RATHER LIKE LEMMINGS meets Populous, The Settlers is another "god-game" set in a medieval world of castles, knights, and peasant farmers. You can open the game with an intro, one of the best 2D animations I've ever seen, or get straight to work being omniscient.
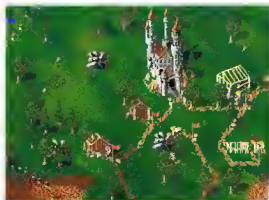
The world of the settlers is one of beauty and extremes - high, snow-capped mountains, deep green valleys, thick forests, glittering lakes, and wide deserts. This world can be sized to meet any would-be king's ambition, from size 1 up to 7, which is simply immense. Cleverly, the landscape eventually loops back on itself - go far enough in any direction and you'll arrive where you started.

It is on this landscape that you place your centre of operations - the castle - and around it the buildings that will be your settlement. When a building is erected (and construction takes time - little builders have to come out of the castle and hammer the structure together), a flag is planted outside the front door. These flags are the intersections of your growing city. Between them you can build roads, or waterways across a lake. On these paths travel couriers, transporting goods between one flag and the next. There are buildings for every kind of industry and agriculture - butcher, baker, (but
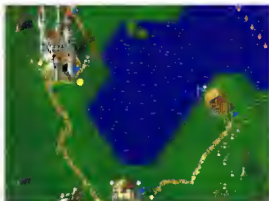
no candlestick-maker), miner, blacksmith, shipbuilders, farmers, windmills, sawmills, lumberjacks, fishermen's huts, and many more. When in production they form an economy of settlers. These industries depend on each other for supply - the farmer scatters seed to grow wheat, harvests it, and sends it to the windmill to turn it into flour. The windmill sends the flour to the baker. The bread goes to the workers in the mines, who extract iron ore and coal from the mountains, for use in a foundry to produce iron. The blacksmith forges the iron into swords and armour for your

knights, which the ironworker uses, with wood, to make tools for the farmer and blacksmith. If you can keep all these supplies balanced, you're really approaching omniscience.

You expand your influence, and thus territory, by building guard huts and watchtowers on your growing frontier. Knights can be trained and used to attack neighbouring settlements, in one-player (the computer controls up to three other kings/queens) and two-player (in which the screen is split for competing settlements) modes. Meanwhile, all your workers - *up to 64,000 of them!* - are doing their own thing - chopping down and planting trees, prospecting and mining for ore, catching fish, milling flour - all with their own tiny animations and sound effects! Brilliant! You'll be glued to the screen and temporarily transported to another world. For the hours (or days!) you're playing Settlers, you'll believe you are a divine, benevolent king (or queen), with the power of life or death over this scurrying population.

I proclaim The Settlers to reign in the current court of godgames. Of course, there is room for improvement. The index the manual promises does not appear - it would be really useful for such an involved, complex game to have one. It would be good to have higher levels of realism, like seasons or storms. The game has a nice, consistent feel, with screens in woodgrain and steel, and the supplied statistics of your settlement are useful, but I'd prefer these to be presented at the end of every year or season, showing your success or failure. Otherwise, The Settlers is the perfect game for anyone with Olympian aspirations. ■
Supplied for review by Micro-World

ADU APPROVED

GRAPHICS ★★★★☆	OCS / 1.3 ✓
SOUND ★★★★★	ECS / 2.0 ✓
ADDICTIVENESS ★★★★★	AGA / 3.0 ✓
PLAYABILITY ★★★★★	**95%**

70

ATTENTION!
ALL CLOSET PETROL HEADS

Acid Software are proud to announce that the racing game of your dreams is now available for all Amiga computers.

Featuring 12 tracks, a special AGA enhancement disk, 4 high-powered dirt racers, modem and null modem capability, up to 4-player competition SkidMarks offers racing fanatics the most realistic dirt racer to date.

With more slides, less control, more collisions, less damage, more understeer, less gravity, Acid Software promises you gameplay that will permanently destroy your defensive driving skills.

Modem owners beware - full comms support means that you can show your skills all over town. A BBS door is currently under development for championships to be held at a BBS near you.

"A milestone in Amiga games. One of the most playable racers ever... If future BlitzBASIC games are as good as this one, we are going to see the Amiga and CD32 become the games machine of the decade. SkidMarks is for Car Racing what Kick Off was to Football."
CU AMIGA SCREENSTAR (92%)

"An immensely satisfying experience akin to peeling those stringy white bits off tangerines... SkidMarks is without doubt the best racing game I have ever played outside of an arcade."
AMIGA ACTION ACCOLADE (90%)

"A no-nonsense, adrenalin-pumping racer. SkidMarks is beautifully simple to play. Like SensiSoccer, this is a timeless two-player game which is likely to be dragged out of your collection time and time again."
THE ONE (88%)

"It brings out those primal competitive urges, better than running around in woods naked and banging on big drums. It's packaged playability, it's canned competition. It is great!"
FORMAT GOLD (90%)

BLITZ NEWS

New AGA support is now available for Blitz2. All the enhanced display capabilities of the AGA chipset have been made available to Blitz2 programmers including 24-bit colour control, 256-colour screens, super hi-res horizontal scrolling, 64 pixel wide sprites and more.

New GadTools support offers the applications programmer access to 12 new gadget types including sliders, scrollers, listviews, and palette gadgets. New ASL support allows the opening of Screen, Font and File Requesters in single commands.

Currently under development for release in subsequent BUM issues (Blitz User Magazines) are:

* Developers-Pack for creating Blitz2 user extensions
* GadTools design utility
* CD32 specific command library
* Highspeed animation language
* Re-release of Blitz2 3D
* 68020 optimized libraries

If you're programming the Amiga and haven't taken a serious look at the fastest growing language in the industry then do so now!

For your closest SkidMarks Dealer, contact:

Pactronics NZ   03 479 0607

HotPoint Australia   02 428 7777

ACID SOFTWARE

Mortal Kombat
Virgin Games ■ NZ$99 ■ A$70

THE ARCADE GAME that last year had the Politically Correct up in arms - caring, sharing arms, of course - has made it to the Amiga. Mortal Kombat is so bad, it even has its own Parental Guidance sticker on the cover. Just how nasty is it? Let Mortal Kombat speak for itself: "...use any means possible to win. There are no restrictions on the use of weapons and Death Blows." Sounds fairly antisocial.


The plot could be from any one of a million kung-fu videos. There's an annual tournament held on a remote island by 500-year-old wizard. Shang Tsung. Contestants must fight each other, the winner taking on a clone of him/herself and two others at the same time, before defeating Shang Tsung's own four-armed mutant champion, Goro, and finally Tsung (who can morph into any other contestant) himself. Makes you wonder why they do it really, since the penalty for losing to Goro is the loss of your immortal soul. (Never mind, it goes to a good home - Shang Tsung eats it.)

The Amiga version's code has been converted, line by line, from the arcade. The contestants, digitised from the performances of real-life martial artists (originally, one was to be Jean Claude Van Damme) are excellent, but their combat moves are a little blocky. (Hardly full-motion video - wait for the CD^{32} version, perhaps.) The backgrounds or fighting environments have suffered, losing some detail, and there are too few of them.

You can choose from seven combatants. Each has standard moves, including kicks, punches, flying attacks, sweeps, and blocks, and a couple of special moves, including a "death move". Duels are the best of three, and you can change your fighter, if you've been defeated during your climb to the top. There's also an excellent two-player mode.

Defeating contestants in Shang Tsung's tournament isn't easy (and can be made harder by increasing their "intelligence" in the options screen) and hampered by the controls - some
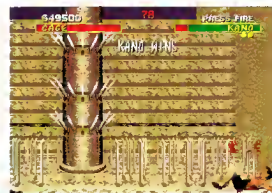
moves take four or five joystick positions to execute. Fighting, particularly as a beginner, is often a matter of waggling the joystick, hitting the fire button frantically and hoping that a move comes off. In addition, the "death moves" are unspecified in the manual, leaving you to find the right combination. This is not really the fault of the game itself, but the limitations of the joystick. While the standard joystick remains limited to eight axes of movement, a game like Mortal Kombat has to use complex and odd combinations of positions to achieve the range of 24 moves each character has. It's only taking the advent of a "virtual reality" controller, like the Nintendo Power Glove, (and they will arrive), to make games like Komhat easier to play.

Although I watched eagerly for a heart to be ripped out, I never saw one. Sure, blood flew and heads rolled, a sampled voice occasionally exhorted you to finish off your opponent and a good uppercut at the right time landed him in a pit filled with spikes for a nasty impalement, but I don't believe anyone could confuse it with reality. For now, Mortal Kombat has replaced my punching bag as an excellent stress-reliever. It's the only recent game that's given me cramp from playing with the joystick - and you can keep your smutty jokes to yourself, okay? ■
Supplied for review by Micro-World

GRAPHICS		
★★★★☆	OCS / 1.3	✓
SOUND	ECS / 2.0	✗
★★★ ☆	AGA / 3.0	✗
ADDICTIVENESS		
★ ★ ★ ★		
PLAYABILITY	**78%**	
★ ★ ★ ★ ★		

Nighthawk F-117A: Stealth Fighter 2
MicroProse ■ NZ$99 ■ A$70

I HAVE A set of criteria I use with flight simulators called "flavour versus fun", or "Is it live, or is it MicroProse?" MicroProse has been the unassailable leader in creating simulators which give a strong sense of realism - "flavour" - without sacrificing fun. So what's new and improved about Nighthawk, the sequel to their incredibly successful Stealth simulator?

The original F-19 Stealth Fighter was released in 1988, before pictures or specs of the "black jet" were widely available. Much of the original simulation was thus based on supposition and guesswork. The collapse of the Eastern Bloc has left many scenarios in Eastern Europe and Asia as merely interesting historical exercises, without the thrill of flying in modern conflicts. Since the Gulf War familiarised the public with F-117A, the appearance and performance of the fighter needed to be upgraded. Finally, the game had to be enhanced to take advantage of the greater power and 256-colour graphics of the IBM.

The latter is of little concern to Amiganauts - MicroProse have not released an AGA version. But the worlds of conflict have been expanded. Five new scenarios have been added - two from another MicroProse sim sequel, F-15 Strike Eagle II - and three others. Since the Gulf War occurred

during development, that was also thrown in, as well as extra scenarios for a 1994 Vietnam conflict, 1995 stand-off in Cuba, and a new Korean war in 1997. All nine "worlds" may be flown under three levels of conflict - cold, limited, and conventional war - and three mission types - air-to-air, ground strike and training, with adjustable levels of realism. Recognising that their projected F-19 was overly optimistic in performance (except for radar visibility), MicroProse have added the option of flying a "real" F-117A or an "enhanced" MicroProse version.

The package does not come with a keyboard overlay for commands, probably because of the variety of Amiga keyboards. However, since most commands are the same as the original Stealth Fighter, owners of that game could use the accompanying overlay. Overall, start and end graphics have been improved, more options added, object detail increased, sound added (including sampled voices), a cinematic Action View deployed, mission generation improved and a kick-ass musical score composed. However, no new aircraft or weapons have been added. The game remains basically the same - choose a pilot and theatre of operation, and find a mission to suit you. Successfully completing that mission wins both promo-

tion and military awards.

Nighthawk probably doesn't justify itself to owners of the original Stealth Fighter. However, for those without combat flight experience, F-117A is a great simulation of a unique aircraft. ■
Supplied for review by Micro-World

GRAPHICS		
★★★★☆	OCS / 1.3	✓
SOUND	ECS / 2.0	✓
★ ★ ★ ★ ☆	AGA / 3.0	✓
ADDICTIVENESS		
★ ★ ★ ★ ★		
PLAYABILITY	**75%**	
★ ★ ★ ★ ★		

Jurassic Park
Ocean ■ NZ$99 ■ A$60

THE CONVERSION OF cinema hits to computer has traditionally produced poor games. Exceptions include the Indiana Jones game series, derived from a film, but which did not follow a related plot. Most games companies pay big money for the rights to a movie, but spend less effort on its conversion, usually producing a simple platform game or a shoot-'em-up, that they hope will sell more on the association with a big name, than its own play values. Games rarely, if ever, give the same thrill or excitement as a cinema experience. (With MPEG video digitalisation and well-planned interaction, this could well change on the CD³² - see Discography on page 68.)

To give Ocean its due, the company has tried to produce a quality product. The game takes its start-point about a third of the way into the film, just after the touring jeep has been mauled and tipped over the embankment by the T-Rex. Dr Alan Grant has been left by the destroyed jeep, but his young charges Tim and Lex have been lost elsewhere in the park. Electric fences enclosing the park have been shut down, some torn away. The dinosaurs are loose and very hungry.

It just so happens that park employees have left medical and weapons supplies scattered around. What a surprise! Of course, Dr Grant can pick these up and turn the park's main attractions into dino-burgers. But your main mission is to find those kids and return them to the visitor area. (Unfortunately, you can't just shoot them.)

The game is divided into interior and exterior scenes. Outside, you're in the enclosures, in a Chaos Engine-style three-quarter view. Here most of the terrain is an obstacle course, with forests, rivers, boulders and plenty of dinosaurs

in your way. You get inside through bunkers or a sewer system.

The park's computer system remains online after the storm. If you can reach a terminal by a motion-detector, you can access the park's security measures, find maps of the current environment, control doors, and do a head-count of the enclosure's reptilian residents.

There are more computer-generated dinosaurs in this game than you ever saw in the movie. Dilophosaurs spit poisonous phlegm at you like packs of dribbling reptilian kangaroos, compsognathi the same dun colour as the ground bite you,

triceratops charge blindly, and raptors and T-Rex just kill and eat you.

Despite all this effort, the Amiga version lacks excitement. Action is slow, and the screen display takes a while to update after you come to a stop, scrolling in tiny increments. Marketing

the game towards the AGA-only A1200 and A4000 hasn't helped. Except for terminal operation mode, the AGA screens could easily be mistaken for clever halfbrite use. Most of the dinosaur sprites are fairly blocky in movement, especially Triceratops (who can only charge horizontally, not vertically). ■

Supplied for review by Micro-World

GRAPHICS ★★★☆☆ SOUND ★★★★☆ ADDICTIVENESS ★★★★★ PLAYABILITY ★★★★★	OCS / 1.3 ✗ ECS / 2.0 ✗ AGA / 3.0 ✓ 65%

Brutal Football
Millenium ■ NZ$99 ■ A$70

NOW, A BALL game where you can hack off the heads of the opposition - *that's* entertainment. Brutal Football takes the basic concept of football, complete with goalkeepers, half-time, and player leagues, and brutalises it utterly by adding swords, grenades and play-field icons. The result is blood on the turf - mutant players

tackling, slashing and stomping each other while in pursuit of the ball. Games are for seven minutes, with no off-sides or out-of-plays - the field is surrounded by walls which rebound the ball. The team to score the most points or slaughter six out of the seven players of the opposition wins. In the event of a draw, a free-for-all ensues.

You can play an "unfriendly" match (one game, or best of three or seven) against seven other teams, a series of knockout rounds, or enter the league competition, in which your team battles against the others to rise to the top of the division scoretable, in one or two-player modes. Between matches, you can retire your team to the locker room, where the players can be fixed up and healed. Medical attention costs money, earned by victory on the field. It's a pity that you cannot improve your players with bionic implants, extra weapons and the like, a la Syndicate.

On the grass the game is great fun. Heads roll, blood spills. There are five basic moves - an attack (be it a tackle or stabbing with the swords
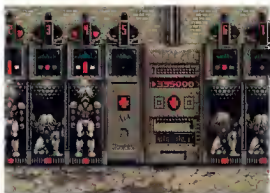
that crop up on the field), a pass, a kick, a flying catch, and a stomp - all easy to master. The game's intelligence, in terms of smart offensive, is fairly good - moving from the opposition (in one-player mode), running the inactive members of your team behind the ball, and deciding which player on the screen should be your "active" team member.

Overall, a game for those bored with the masses of ordinary soccer simulations out there. Brutal Football is hard, fast, and a lot of fun. ■

Supplied for review by Micro-World

GRAPHICS ★★★★☆ SOUND ★★★☆☆ ADDICTIVENESS ★★★★★ PLAYABILITY ★★★★★	OCS / 1.3 ✓ ECS / 2.0 ✓ AGA / 3.0 ✓ 80%

73

SkidMarks
Acid Software ■ NZ$99 ■ A$70

A FEW MONTHS ago, I had a sneak preview of a new racing game. It looked promising - ray-traced vehicles on a large, scrolling track; two players or more with modem support; good sound effects. For its commercial birth, Skid-Marks has grown, now delivered on four floppies. One is for AGA machines, containing updates for the car frames (800 frames for each vehicle, rendered in Imagine). Another, the main program disk, may be installed on a hard drive. The others are copy-protected track disks, which must be run from the floppy drive (clever idea, that).

SkidMarks is basically a rally racing game against computer and/or human drivers. There are now twelve different tracks, with jumps and obstacles; four different computer racing teams; three levels of difficulty; many different cars (including AGA), which you can paint to your preference; and three racing modes - practice, championship, and match race.

It's a game for competitors, the more the merrier. The cars driven by artificial intelligence don't remain enough of a challenge, after you've become familiar with a track, but human opponents will always surprise you. The game is designed to take full advantage of this with its own modem link, so that two machines can be connected, either across a null modem cable or
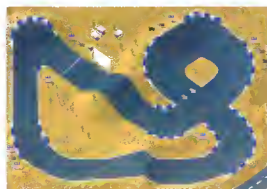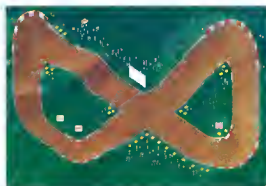
the telephone line, thus supporting up to four players. The modem link even has keyboard macros, so you can fire off quick insults to each other, or suggest strategies.

I'd like a more ego-boosting championship competition (you race six tracks in fixed order, but no-one is declared overall winner at the end); quicker acceleration in some of the vehicles; and a better rev sound to judge speed. Perhaps a tach or speedometer could be added below the track display, or even a gear change. I'm looking forward to further enhancements promised by Acid in updates - like a track editor, car designer, and super AGA version. In the meantime, SkidMarks is a great example of what a racing game should be, with connectivity, competition, and fun. ■

Supplied for review by Acid Software

GRAPHICS ★★★★	OCS / 1.3 ✓
SOUND ★★★★ ✗	ECS / 2.0 ✗
ADDICTIVENESS ★★★★ ★	AGA / 3.0 ✓
PLAYABILITY ★★★★ ★	**82%**

The Great Giveaway...
Amos Giveaway...

PD Plus
JD & Virus Extensions

What does JD stand for?

Answer this question on the back of an envelope, along with your name and address, and you could win this great disk.

Post your entries to:
PD Plus Competition, c/- ADU
(See page 10 for address)

Sponsored by
PD Plus

PD Plus 101 Games Pack

Winner: Bruce Read
ACT, Australia

The Lost Treasures of Infocom

Who distributes Lost Treasures in Australasia?

Place your answer on the back of an envelope, along with your name and address, and post your entries to:

Infocom Competition, c/- ADU (see pg 10...)

Winners...

Wordworth v2AGA

A. Laurenson
Christchurch
New Zealand

Bertrand Ong
WA
Australia

Amos Professional
Compiler

What does AMAL stand for?

Put your answer on the back of an envelope, along with your name and address, and win this excellent utility!

Post your entries to:
Compiler Competition, c/- ADU
(See page 10 for address)

Sponsored by
Pactronics

Congratulations to ADU 6's winner of The Lost Treasures of Infocom:

Paul Penny of Queensland, Australia

Sponsored by
ACTIVISION

Technosound Turbo 2

Daniel Nixon
Kaitaia
New Zealand
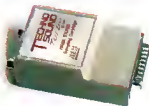
Conditions of Entry

The winner for each competition will be drawn at random from all correct entries received by Monday, 21st March. All winners' names will be published in ADU 9. Entries are limited to one per person, for each competition, and all entries must be accompanied by the appropriate coupon. The judges' decision is final, and all correspondence regarding results will be filed under "T" for Trash.

Elizabeth Corish brings you

GAMES MASTERY

WELCOME ONCE AGAIN to the world's best, most up-to-date hints and tips magazine column. Each issue we try and bring the latest from around the world to your living room and this issue is no exception. So on with the show...

Bob's Bad Day
(Psygnosis)

Try these codes to the first 50 levels of this very different game:

Level 1: ZAABCZOD
Level 2: ZBFBCYPD
Level 3: ZBFBCYOD
Level 4: ZCKBCXND
Level 5: YBFBCYOD
Level 6: YCKCCXPD
Level 7: YCKCDXOE
Level 8: YDPCDWNE
Level 9: XBFCDYQE
Level 10: XCKCDXPE
Level 11: XCKDDXOE
Level 12: XDPDDWNE
Level 13: WCXKEDXQF
Level 14: WDPDEWPF
Level 15: WDPDEWOF
Level 16: WEAEEVNF
Level 17: VBFEEYQF
Level 18: VCXEEXPF
Level 19: VCKEFXOG
Level 20: VDPEFWNG
Level 21: UCKFFXOG
Level 22: UDPFFWPG
Level 23: UDPFFWOG
Level 24: UEAFFVNG
Level 25: TCKFGXOH
Level 26: TDPGGWPH
Level 27: TDPGGWOH
Level 28: TEAGGVNH
Level 29: SDPGGWQH
Level 30: SEAGGVPH
Level 31: SEAHHVOI
Level 32: SFFHHUNI
Level 33: RBFHHYQI
Level 34: RCKHHPXI
Level 35: RCKHHXOI
Level 36: RDPIHWNI
Level 37: OCKIIXQJ
Level 38: QDPIIWPJ
Level 39: QDPIIWOJ
Level 40: QEAIIVNJ
Level 41: PCKJIXQJ
Level 42: PDPJIWPJ
Level 43: PDPJJWOK
Level 44: PEAJJVNK
Level 45: ODPJJWQK
Level 46: OEAKJVPK
Level 47: OEAKJVOK
Level 48: OFFKJUNK
Level 49: NCKKKXOI
Level 50: NDPKKWPL

Alien Breed 2
(Team 17)

Here are some codes to give you an unfair advantage:
000000 or 098654   Ten lives are yours
243 or 433 or 736363 For 50000 credits
378829   Obtain 50 keys
For those that simply want some level codes, take an optic at these:
Level 2: 353828
Level 3: 108383
Level 4: 379101
Level 5: 982822
Level 6: 847464
Level 7: 737373
Level 8: 928112
Level 9: 287364
Level 10: 193831
Level 11: 090921
Level 12: 309383
Level 13: 101221
Level 14: 103992
Level 15: 998112
Level 16: 125332
Level 17: 091233

Graham Gooch's Cricket
(Audiogenic)

For unlimited runs against the computer, try this nifty tip. After belting the ball and the fielder gathering it up, press "P" to stop him, then press fire to keep the batsman running. Once you have heaps of runs, simply push ESC to return to normal play.

Assassin
(Team 17)

For great entertainment, try these codes on the high-score table and see what happens: Alien Breed, Assassin, Body Blows, Project X, Psionic Systems, Superfrog, The One and Only.

Theatre of Death
(Psygnosis)

More than likely you have made it halfway through the Grassland section only to get bogged down (no toilet jokes please!). If that's the case, try entering these codes to the various missions, which will take you right through to the Lunar scenario.

30D77E8033700   342B2DD976270
772B8AF16D6C1   772BFF5749D41
7729141E63AB1   772AA2582FB51
7729FFAD31161   772394B21C8F1
77345DE216DF1   77ACB605287E1
7754B4EE34D31   7C5B44CF63301
76C01ED533AE1   6031769A65812
60317BA37F432   603009EC0DA82
6036F67417602   603B261E13B62
60258A7348712   603BA0D66F4E2
6091983A071A2   61228DF823A42
627AF1B13DCF2   650435B824C72
6F4115790F872   78D436B416E82
56401FA71DDE3   5640619A3CE73
56408067779A3   5641F45F04923
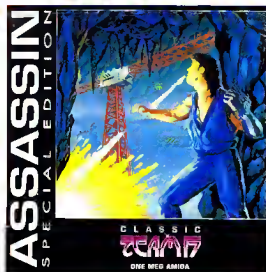5647681A3DA93
(or)

Try this code to skip to the Lunar mission as well:
5640531D482C3

SPECIAL EDITION ASSASSIN

CLASSIC
TEAM17
ONE MEG AMIGA

Syndicate
(Electronic Arts/Bullfrog)

Nothing like some passwords to make your life that little bit easier. From the configuration screen, enter these into the company name section:

MARKS TEAM	The ultimate team, research and cyborgs.
COOPER TEAM	Should also give you a pretty good team.
MIKES TEAM	Standard run of the mill-type team.
NUK THEM	Begin from the country of your choice.
OWN THEM	All countries are within your grasp.
ROB A BANK	How to obtain big bucks in under 60 secs.
WATCH THE CLOCK	Overview whole game as time flies by!

WIN Elite 2

The first person to send by mail or fax the correct answer to these four questions will win Elite 2, courtesy of Pactronics NZ Ltd. There will be one winner in NZ and one in Australia. Send your answers to Pactronics NZ Ltd., PO Box 531, Dunedin, New Zealand, or fax +64 3 479 0607.

1. How many copies of Elite were sold (across all formats, to the nearest 1000)?
2. What was the name of the computer company in "War Games" that the kid was searching for by modem?
3. What was the name of the hacker from the film "Tron"?
4. What year was the original Elite released?

Due to a highly technical problem beyond the intellectual capabilities of the normal mortal, I will have to incorporate the whole solution to Elf in the following issue - sorry dudes.

Also stay tuned to the next issue where we give out tips for Elite 2, probably the biggest selling Amiga game for 1993.

For all those Trekkie fans out there, I leave you with Mr. Spock's immortal words: "Live long and prosper."

Civilization
(MicroProse)

Here's the rest of the technology chart, as promised.

Mass Production: An element to be pursued at the earliest opportunity. To help reduce pollution (which increases in the earliest phases of this path), create a mass transit unit. It is also essential if you are going to win the end game.

Mathematics: When you decide to choose this path, you will be able to create the catapult unit (later superseded by the cannon).

Medicine: During the middle part of the game, certainly worth a look. This will lead to two immediate paths, chemistry and genetic engineering. Ignore the latter and concentrate on chemistry.

Metallurgy: Select this as soon as possible. With it, you may create cannon units. It also leads to other important discoveries such as electricity and steel.

Monarchy: During the early part of the game and especially if at war, select this path as this is the best model suitable for this course of action. It helps develop towards other forms of government. Later it will help develop feudalism, chivalry and knight units.

Mysticism: Most players overlook this path. Don't! It leads to astronomy and philosophy. So be sure to choose this at an early stage in the game.

Navigation: Another big choice, not to be missed. Opens up the game, and, more importantly, the world. During these early discovery days, ensure you have the monarchy in charge.

Nuclear Fusion: Obviously appears late in the game. Leads to nuclear power and fusion power. Renders Newton's College obsolete.

Nuclear Power: Reduces pollution, and creates energy at a fraction of the normal costs associated with it. A prime selection, but follow it up with fusion power as soon as possible to avoid melt-downs.

Philosophy: An important milestone because it opens up so many other aspects, especially democracy and religion.

Physics: Quite important as it leads to a number of other paths such as atomic theory, flight, magnetism and the steam engine.

Plastics: Obtained in the final stages of the game. An important path as it leads to robotics and superconductors. Make sure you have mass production before selecting this path; otherwise you will have a real problem with pollution.

Pottery: A major advancement in the very early stage of the game. After the alphabet, this should be your next possible choice, with masonry coming next. With pottery under your belt, it allows you to create a granary which prevents famine as your city grows.

Railroad: Obviously a major development; enables faster growth, extra production, faster deployment of troops, and allows for industrialisation to really take off.

Recycling: Only those players who have a real problem with pollution in their cities need look at this path.

Refining: Is a milestone which leads to combustion and plastics - impor-

Sid Meier's
CIVILIZATION
Build An Empire To Stand The Test Of Time
AGA VERSION
PRODUCED BY
SOFTWARE DEMON LTD.   MICROPROSE

tant if you are to win the game. It does not pose any threats to further pollution and increases production by fifty percent in cities where you have built power plants.

Religion: Important in the middle stages of the game. If you have a lot of unrest in your cities, choose this path and build cathedrals to placate dissidents. If you have made it to the latter stages of the game without it, you can ignore this choice.

Robotics: An important path to take as soon as possible which leads to artillery units, manufacturing plants, and spaceship modules. Note, manufacturing plants, though costly, have tremendous benefits in terms of production.

Rocketry: The end game is in sight once this becomes available, so select it at the first opportunity.

Space Flight: Important discovery following on from rocketry. You should move on to the end game with all speed, and start work on the Apollo programme.

Steam Engine: As this leads to the railroad, an important path to take up as early as possible.

Steel: With the advent of industrialisation and metallurgy, this path becomes available to you. With it you may create battleship units. Steel also then leads on to important items such as the automobile and mass production. Don't forget it!

Superconductor: In the later stages of the game, choose this immediately if you are threatened by nuclear attack. With the superconductor under your belt, you can build the SDI defence unit.

The Corporation: Another important path which opens up many directions of advancement, including mass production and refining.

Theory of Gravity: Provided Newton's College has not been discovered by someone else, select this path which then leads to atomic theory. Otherwise you can wait till later and take on atomic theory at the point of discovering physics.
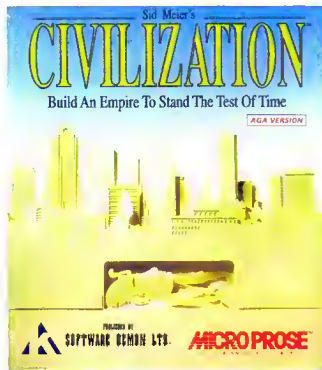
The Republic: Once you have the code of laws and literacy, provided you are at peace, consider choosing the path of the republic. It opens up banking and conscription which are important in the middle to later stages of the game.

Trade: An obvious choice as soon as possible, greatly increasing your prosperity and production. Its immediate benefit is the creation of the caravan unit. The two paths from here are the banking and medicine advances.

University: This becomes available around the middle part of the game and can be put off for a little while if need be. However, to complete the game, you will have to choose this path at some time. This renders the great library obsolete. The three paths that become available after university is chosen are chemistry, metallurgy, and gravity.

The Wheel: In the early part of the game, if you are at peace, you can ignore this for the present. If, however, you are at war, then select so you can create chariot units.

Writing: Make this a priority. You now can create diplomat units and libraries which have several purposes in both peace and wartime scenarios.

Picasso II

Retargetable Graphics* have arrived!
24-bit graphics for your Amiga®

Picasso II RTG (Retargetable Graphics) means incredible New Graphics Power for your Amiga.

1280 x 1024 256 colour Workbench screen displayed on an A3000 with the Picasso II.

Providing greater resolutions and more speed than AGA systems and the ability to run system friendly AGA software, the Picasso II is a next generation graphics display system. Your Amiga will be able to run all the latest software at resolutions up to 1280 x 1024 with 256 colours on screen. The Picasso II also supports custom screen modes with up to 16.7 million colours at resolutions as high as 800x600.
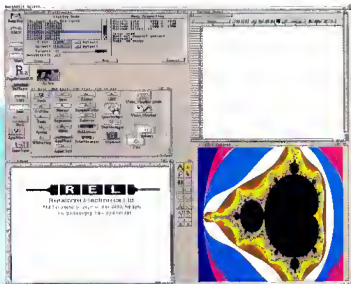
Picasso II RTG means *No Waiting for Specially Programmed Versions of Your Favourite Software.*

The Picasso II RTG emulator is completely integrated into the system. Imagine being able to run the latest software packages like ProPage 4.1, PageStream 2.2, Cygnus Ed 3.5, Deluxe Music Construction Set 2.0, AmigaVision Professional and many others at resolutions up to 1280x1024 and up to 256 colours. All system friendly Amiga software packages will be able to take advantage of the new screen modes offered by the Picasso II.

Picasso II RTG means *Hi-Performance.*

The Picasso II has an on-board Blitter which supports drawing speeds up to 30 megabytes per second. The Picasso II Blitter has been fully integrated into the RTG emulator. Any program running under the RTG emulator will automatically take advantage of the Blitter. Off screen displays are moved into Picasso II display memory using the Blitter for super fast screen updates.

Picasso II RTG means *No More "Chip Ram Blues"*

The Picasso II RTG emulator has been designed so that it uses no chip ram for its emulation. Only the currently visible display is kept in the Picasso II display memory; all other screens are stored in standard system memory. This means that all system memory can be used as graphics memory. A system equipped with 16 megabytes of ram would be like having a 16 megabyte graphics board!

Picasso II RTG means *Maximum Compatibility.*

The Picasso II RTG emulator supports Workbench 2.04, 2.1, 3.0, and beyond. The Picasso II is compatible with any Zorro II or Zorro III equipped Amiga system, such as the A2000, A3000, or A4000.

Picasso II AutoSwitch means *One Monitor.*

The Picasso II comes with a built in electronic switch that automatically routes the proper signal to your monitor. When the AutoSwitch detects non-Picasso II screens, such as those used by games and older software, it automatically routes the signal directly to your monitor. When the AutoSwitch senses a Picasso II screen mode, it will automatically switch back.

The Picasso II comes packaged with TVPaint Jr. (24 bit Paint Program), and drivers for ArtDept Professional, ImageFx, ImageMaster, and Real 3D 2.0.

*Re-tar-get-ab-le Gra-phics adj.: The ability to run software on any third party graphics board. See also: Picasso II.